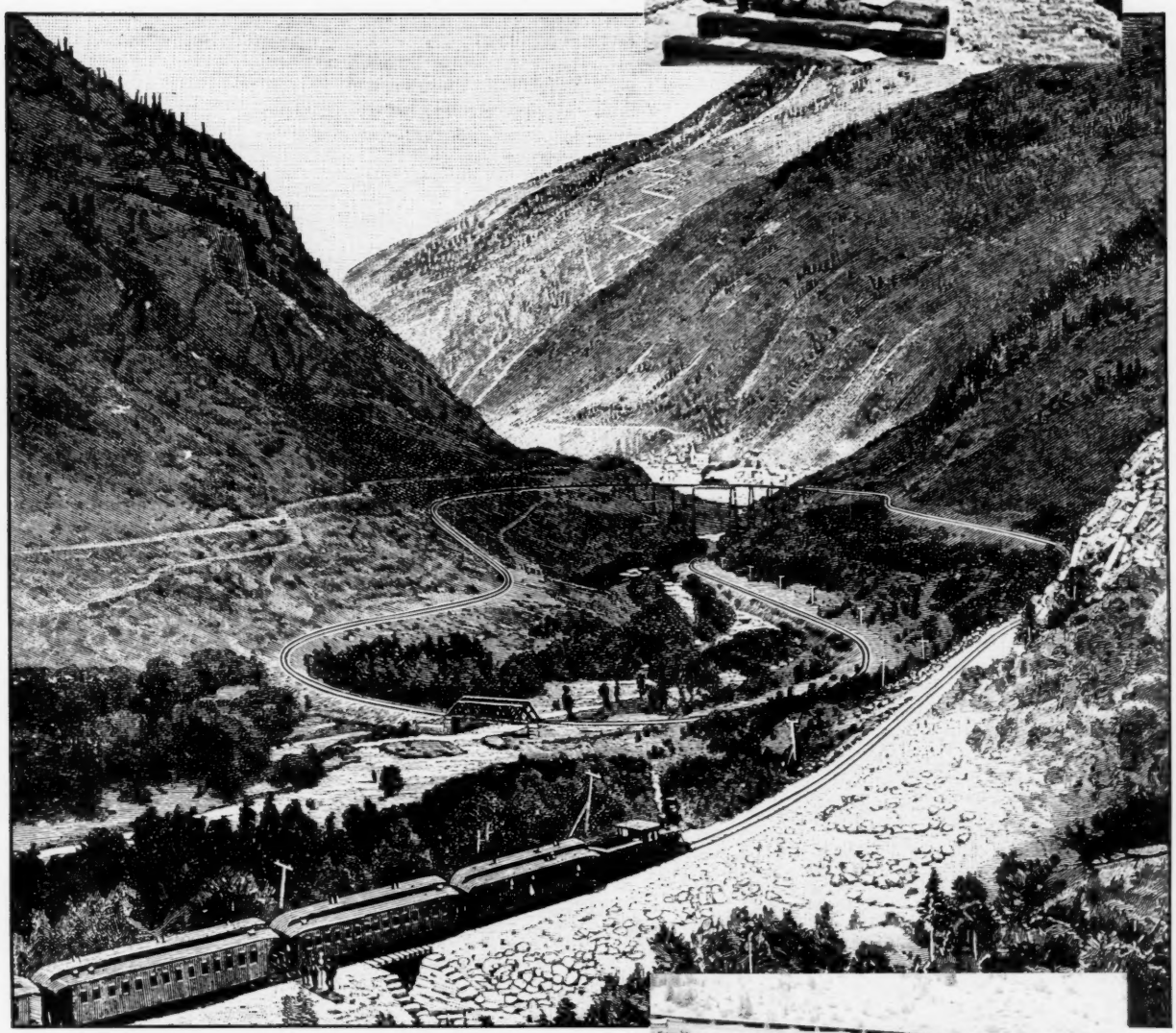
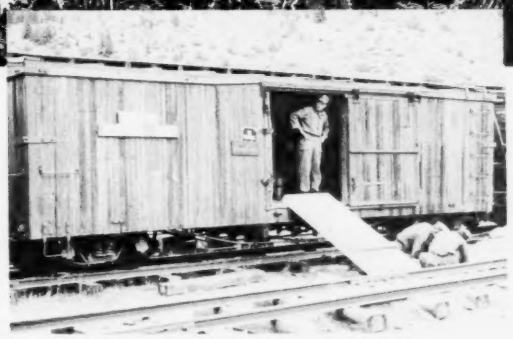
NAVY CIVIL ENGINEER

SPRING 1974



Seabees And Colorado's Historic Georgetown Loop



ENGINEERS... SEE BACK COVER!

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The United States Navy
CIVIL ENGINEER CORPS
and the
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Washington, D. C.

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Monuments at CBC Davisville

BY LCDR A.N. OLSEN, CEC, USN
Naval Postgraduate School Monterey

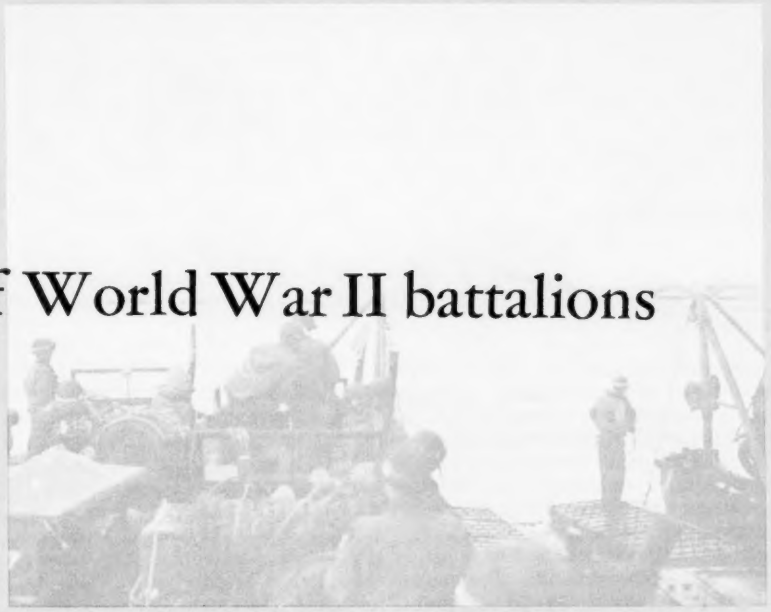
. . . recall sojourns of World War II battalions

In early 1942, contractors commenced construction of the Naval Construction Center at Davisville, R. I. for military training and specialized training in the use of construction equipment and methods. Through this center, which became more generally known as Camp Endicott, passed over 100,000 men for individual training or construction training with one of the 90 Naval Construction Battalions or the 25 Construction Battalion Maintenance Units that came through on their way to their overseas destinations.

Today at CBC Davisville, a few monuments of certain early Seabee units remain. Undoubtedly, three carved on stone and one of reinforced concrete are the work of men of the units. These are the only remaining markers bearing the numbers of original World War II battalions. The two most prominent are those of NCBs 111 and 115, which have been relocated adjacent to the center's flagpole. Two other markers on large stones remain at their original sites near the present administrative area of the construction equipment department. They memorialize NCBs 81 and 96. This area was originally the location of the Advance Base Depot, named Camp Thomas.

The wartime activities of these battalions range from the memorable service of the 111th's 'Rhino Ridin Constructioneers' aboard the causeways that linked offshore ships with the invasion beaches at Normandy to the modest claim of the 115th that theirs was ". . . the battle of mud, mosquitos, jungle rot . . . and homesickness".

Army truck eases down ramp of pontoon ferry to Utah beach, operational site for the 111th Naval Construction Battalion.



NCB 81 operated the rhino ferry carrying men, vehicles and equipment to the invasion beach at Normandy.

A review of the construction projects of each of these battalions and the rapidity with which they performed them helps one to understand how the motto, 'Can Do' came into being.

More remarkable is the fact that their jobs were accomplished in the times before the Navy's logistic system was expanded to include construction consumables. For example, when the 115th was operating in New Guinea constructing one of the largest support depots in the Southwest Pacific, their first task was to set up a sawmill to produce lumber from timber they themselves logged. Simultaneously, other crews were placing concrete building foundations 24 hours a day; equipped with only a number of hand-loaded six-bag concrete mixers, they placed the equivalent of two square miles of concrete eight inches thick.

Three of the four battalions served in both the European and Pacific theatres; only the 115th performed its entire service in the Pacific.

Unfortunately, the battalion that possibly had the most interesting history as far as combat is concerned, the 81st, has the least amount of historical data. It is known that they participated in the amphibious landings and beach operations on Utah Beach during the allied invasion of Europe at Normandy, France. Completing their operations there, the 81st NCB returned to Davisville and, following a brief rest and reorganization, deployed to the Pacific to participate in the Okinawa campaign, where they remained to the war's end.

"Marrying up" a string of pontoons to an LCT to make a "rhino ferry". The 81st NCB assembled and operated these innovative devices at Omaha Beach.

Although designated a 'Construction Battalion', the 81st and its companions, the 11th on Omaha Beach and the 1006th NCB Detachment operating the pontoon causeways to both beaches, are undoubtedly the 'grand-pappys' of our present-day amphibious construction battalions.

Commanding all Seabees during the invasion was the skipper of the 111th, Cdr. (later RAdm.) Douglas C. Jardine, CEC, USNR. Although designated a 'pontoon' battalion for the Normandy operations, the 111th had been the first of the 'Acorn' battalions, a unit intended to provide construction of pre-designed small air bases.

For Normandy, the 111th and the 81st assembled nearly 23,000 pontoons

Crews of the 111th NCB launch a string of assembled pontoons by dozer into the harbor at LeHavre, France.

NCB 115 logging crews produced timber for construction at Milne Bay, New Guinea.

into 'rhino' ferries, tugs and repair barges, and trained and furnished personnel to operate them in the invasion. The part these pontoon units played in the invasion is now history, and their importance is indicated by records of the battalion and the 25th Naval Construction Regiment, of which they were units. These show that between D+2 and D+10 over 16,600 vehicles and tanks, 12,395 personnel and 86,591 tons of ammunition and supplies were carried ashore on the 'rhinos' or handled over the causeways to the two beaches.

A heavy storm battered the beach installations between June 18th and 21st, and left them inoperable. The Seabees rebuilt the floating elements and resumed full operation by the end of the month. During the ensuing months until the beaches were shut down on October 21st, 1944, the Seabees handled 68,750 vehicles, 332,000 personnel and 569,000 tons of ammunition over Omaha and Utah beaches.

On their transfer to the Pacific in March, 1945, the 111th remained in the pontoon business, supporting the U. S. Army's 31st Division in Mindanao, Philippines, in April; operating causeways for the Australians at Tarakan Island, off the Borneo coast, in May; and, later, on the Australian 9th Division invasion of Labuan Island at the entrance to Brunei Bay, Borneo.

The 111th later supported the Australian 7th Division's beach assault on Balikpapan, Borneo. The 'Three Aces' battalion operated out of Calicoan Island, Philippines until it was decommissioned on October 5th, 1945. At this time the causeway crews were transferred to Japan to assist in the occupation.

While operating in New Guinea the 115th battalion was engaged in a battle with an opponent as formidable as any Japanese unit and on occasion even more treacherous. Their principal adversary was nature. Throughout the construction phase they fought the rains. During the period February through September 1944 rain was an everyday and everynight occurrence. Total accumulation of up to 30″ in a 24 hour period was not unusual. The rains washed out the battalion's rock quarry, mud slides completely demolished buildings and flood waters swept away stockpiles of supplies. Their problems were not necessarily due to poor site selection inasmuch as there were no other choices. It was a matter of building at a specific site or not at all since other areas were either less suitable or not yet under Allied control. In spite of the elements, the 115th completed their work by early January 1945. When they departed Milne Bay, New Guinea for the Philippines they left behind them the largest depot facilities in the Southwestern Pacific.

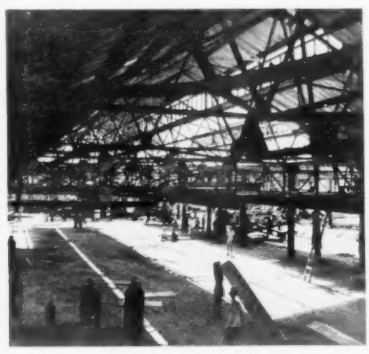
Arriving at what was formerly the Olongapo Naval Base in Subic Bay, Philippines on 8 February 1945 the Seabees of the 115th were the first U. S. troops to go ashore there. Japanese troops were still dispersed throughout the jungle area. Residents of Olongapo City would call "Victory Joe" to any Seabees they saw but even with U. S. troops in the area they would not venture out of their houses for several days. After 14 days of bitter fighting, the Army finally killed or captured 5000 Japanese in the Zig-Zag Pass area adjacent to Olongapo. Meanwhile the Seabees of the 115th worked on the rebuilding and expansion of dock and wharf facilities to provide berths for three victory ships. The waterfront facilities, together with supply warehouses being built at the same time, were significant in the development of Subic Bay as a supply and repair depot.

The U. S. naval base at Olongapo included a repair facility prior to its

(continued on page 38)

LCT docked at a causeway operated by NCB 81 at Omaha Beach.

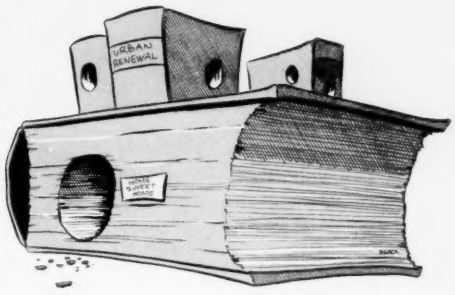
Pontoon crews assemble a 1 x 18 string on floating assembly ways at Samar, Philippines.



Shipfitters shop being rebuilt at Olongapo Naval Base, destroyed by retreating Japanese.

Tome, Sweet Tome

ACADEMY LIBRARY BOOKS DEBUGGED



By GEORGE U. WISE
Entomologist, Northern Division, NAVFAC
• Philadelphia, Pa.

Shortly before construction was completed on the new Nimitz Library at the Naval Academy, it was revealed that the nearly 400,000 general volumes and 10,000 rare books and documents housed in five separate locations in Annapolis, Md. were infested with insects. Both roaches and silverfish, which damage books by feeding and staining, had been observed in the books. In addition, insect tunnels and galleries in the older volumes indicated damage had been occurring over a period of perhaps many years.

To add to the problem, a heavy rodent infestation was discovered in the new library as it neared completion. They had been attracted to lunch scraps left by the workmen. If allowed to remain, many volumes would have been damaged by the rodents gathering nesting material and many secretaries might be screaming from the tops of their desks. The contractor was instructed to clean up the area and eliminate the rodents.

At the request of the academy, the author, an entomologist in the Maintenance Division of NAVFAC's Northern Division, Philadelphia, inspected the new and old libraries and developed the plan for killing the insects and protecting the books and manuscripts from future infestations.

The plan had two systems: one for the 390,000 volume general collection, and the other for the 10,000 volumes of priceless books and manuscripts.

The general collection was treated conventionally with residual insecticide, methoxychlor, which was applied to 24,000 linear feet of baseboards before the carpeting was laid to kill insects crawling on the floors. Then 70,000 linear feet of shelving was treated to kill insects crawling up to or out of the books. Finally, after transfer of all the books to the Nimitz library, 3.2 million cubic feet of the interior was treated with a space spray containing synergized pyrethrin. The space spray is both a poison and an irritant to insects. It forces them from their hiding places and across the methoxychlor barrier, where they expire.

Treatment of the 10,000 rare books and manuscripts was considerably more complex. Fumigation was considered most appropriate, because of the value of the items: for example, early editions of Milton's *Paradise Lost,* Cervante's *Don Quixote,* Audubon's *Birds of America,* St. Augustine's *City of God,* and a Nuremberg Bible were among the volumes. Others were the Park Benjamin collection of books on the history of electricity, some dating from 1600 A.D.; 142 ships' logs, including some from the American Revolution; and 20 volumes of the personal papers of Dr. Robert H. Goddard, the father of American rocketry.

Penetration of fumigant into the books was considered necessary to kill any insects inside. Such an operation would require a toxic gas, which entailed elaborate preparations, safety precautions and extra handling.

The easiest solution was to fumigate the collection in place at the existing locations by simply dropping a plastic tarpaulin over the books, shelves and all; but this would have required evacuation of the old library and adjoining buildings. Moving the items to their new location for fumigation was also considered, but the Nimitz Library was so "tight" that ventilating after fumigation would have been difficult. It was necessary, therefore, to eliminate the pests before transfer of the collection and the best place to fumigate was in the trailer used to transfer the books.

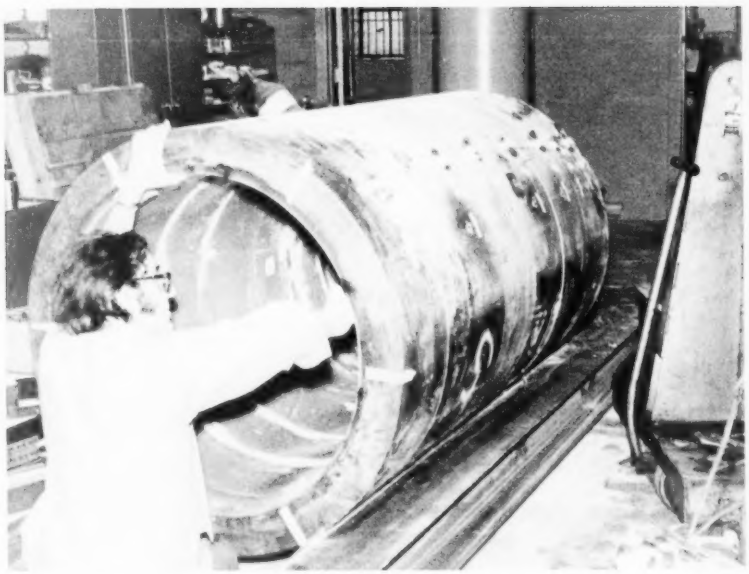
Several fumigant gases were considered and rejected. The Library of Congress and technical representatives of fumigant manufacturers were consulted to determine the possible effect of each gas on old books and manuscripts. Methyl bromide was rejected because it can impart a foul odor to leather bindings. Sulfuryl fluoride was excluded because of the likelihood of increasing the acidity of the old paper, hastening decomposition and deterioration. Some of the older books were embossed with gold, which eliminated phosphine because it discolors gold. Finally, carboxide, a mixture of ethylene oxide and carbon dioxide, was selected. The fire hazard commonly associated with ethylene oxide was eliminated by the CO_2.

A 3700 cu. ft. trailer van was loaded with the books, manuscripts and records and prepared for the introduction of gas. Fumigant tubing was placed into the van, which was then covered with a plastic sheet to form an air tight envelope over the entire body. "Sand snakes", 6″ plastic tubes filled with sand, seal the bottom edges of the plastic to the warehouse floor. After evacuating the building, M. L. Riser, pest control supervisor at the academy and the author began the fumigation by "shooting" the gas through the tubes into the van. A concentration of carboxide (15 lbs/1000 cubic feet) was admitted, then monitored every two hours for 24 hours to assure complete penetration. Then with gas masks securely fastened, the men opened the envelope to begin aeration with high-capacity blowers directing fresh air into the van. Within an hour, the van was safe to enter.

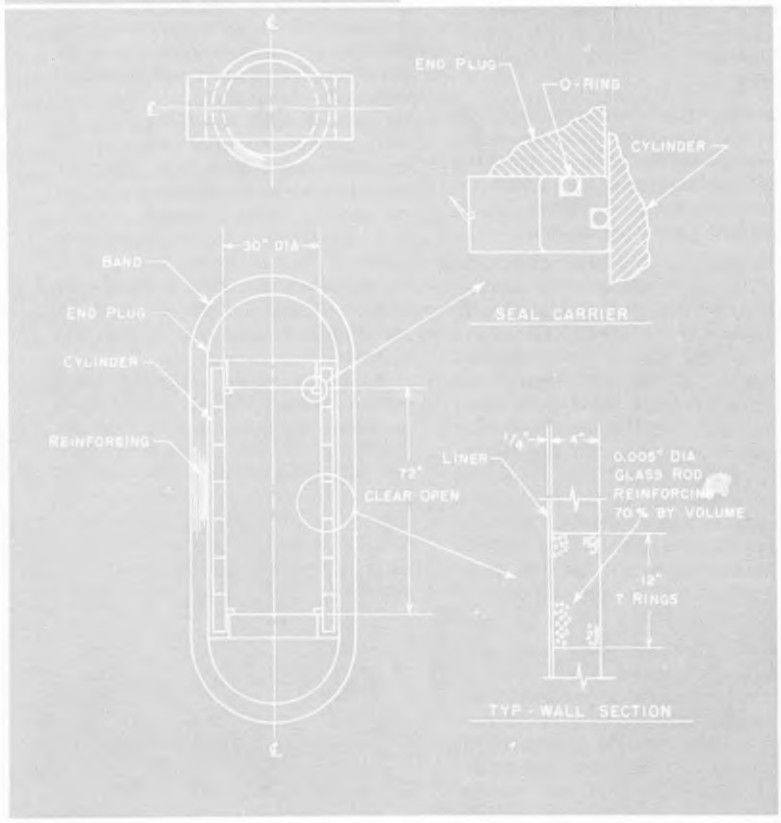
As a result of the fumigation being performed by NAVFAC and academy personnel the costs amounted to approximately $2,000 — much less than an initial commercial proposal of $72,000 to fumigate the entire Nimitz Library. The "savings" of some $70,000 is a welcome occurrence in these days of cost reduction and austerity.

CHESDIV Guides Production

Deep-Ocean Simulator Built for NOAA



Fully assembled cylinder. Note several strain gauges spaced along length of outer surface.



Cross section of glass pressure vessel with details of seal carrier and typical wall section.

• Washington, D. C.

The National Oceanographic and Atmospheric Administration (NOAA), Department of Commerce, recently acquired a deep-ocean simulator that had the unusual requirement of being totally non-magnetic. The simulator is to be used by NOAA to calibrate deep ocean instruments. The pressure vessel was designed and fabricated from a monofilament glass "advanced composite" by the Illinois Institute of Technology Research Institute. The Chesapeake Division of NAVFAC was selected by NOAA to provide the technical expertise to monitor the design, manufacture and testing of the vessel.

The pressure vessel is 30" inside diameter by 72" clear inside length; the maximum operating pressure is 10,000 psi. The temperature variation of the salt water testing medium is controlled to within 0.01°F.

The vessel consists of a series of rings that resist hoop load, two end plugs that provide end pressure seal, and bands that resist longitudinal load.

The three structural elements; rings, end plugs and bands, are fabricated in the form of "advanced composites." The term "advanced composites" includes all forms of materials that are reinforced to improve strength, stiff-

By FRANK GORMAN
Head, Hyperbaric Facilities
Project Management Office
Chesapeake Division

Long loop bands aid in resisting longitudinal load in the cylinder.

ness, or some other mechanical property. In this case, 0.005" diameter glass rod is used to reinforce epoxy resin. The composite is 70% glass by volume and has an ultimate tensile strength of 200,000 psi.

The material is similar to reinforced concrete in that it's strength and elasticity are different in all directions (anisotropic). The O-rings are in a seal carrier that is molded from talcum bearing epoxy. The epoxy liner is specially formulated to act as a fluid barrier.

The manufacturing procedures of the elements are proprietary; however, the procedure for a ring might be to build a mandrel of a diameter equal to the inside diameter of the ring. The mandrel is mounted on a lathe type device so that it may be slowly rotated.

The reinforcing is purchased in "tape" form on a spool with approximately 120 reinforcing rods in the tape. The rods are held together by epoxy resin in a partially cured condition.

The end of the tape is fixed to the mandrel and the mandrel is rotated. The tape is fed under slight tension to the ring as it forms on the mandrel. The epoxy on the first or inner windings must be cured so that it can support the radial load produced by the tension in the outer windings. Other steps are required to produce the finished ring.

A cylinder wall ring (front) and a seal carrier.

Several technical problems called for special attention in the fabrication of this vessel. They were:

Unusually large deflections take place that must be accounted for in the design. The modulus of elasticity of the material is 6.5×10^6 # in.^{2} The increase in vessel diameter under operating pressure is 3/16 inch.

The seal carrier is particularly affected and must be sufficiently elastic to expand radially, with the rings, in order to maintain the seal. As the rings expand the carrier scrubs against the end plug. In addition, it has to be free to scrub longitudinally against the cylinder wall as the distance between the end plugs increases. The carrier must remain stable during pressurization and depressurization cycles; that is, it must not rotate and break the seal.

Complex stress distributions exist in the cylinder walls in the vicinity of the seals outboard of which there is no internal pressure and no tendency to expand. Finite element stress analysis was conducted to evaluate the local discontinuity stress in the thick wall vessel.

The analysis provides hoop, longitudinal, radial, and shear stresses, as well as radial displacements. The stresses must be carefully analyzed and evaluated because the composite is "brittle" (has a straight stress-strain curve from zero strain to rupture).

While the material does not possess the "forgiving" qualities of a ductile steel, it does not fail catastrophically as does a brittle steel. When rupturing, these vessels go "a string at a time." Of particular concern are the shear stresses, because the composite may have an ultimate shear of as little as 3,000 psi, depending on fabrication quality.

The end plugs displace longitudinally; the distance between them increases ½ inch. This is a result of the elongation of the bands. Shear stresses must be screened in two cases: first, at the junction of the straight and curved section the classical stress pattern changes from straight line to hyperbolic.

In the second case, the increase in length of the curved section results in those portions of the band, at the point of tangency, attempting to become straight.

In order to accomplish the design and manufacturing task for which little precedent exists, each step along the way was checked with laboratory data:

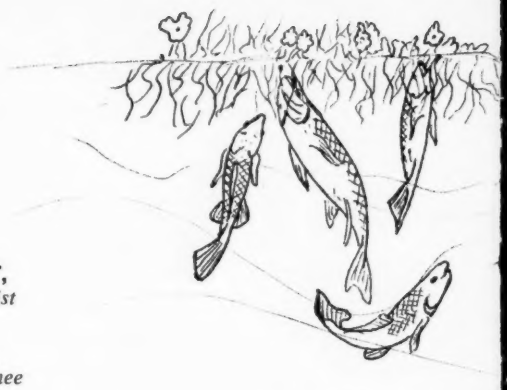
Finite element stress analyses were conducted in order to get as accurate a statement of stresses as possible. Laboratory data was researched and developed ot determine all ultimate stresses including fatigue data. The work was monitored closely by Chesapeake Division personnel.

Each component, ring, band, etc., was individually tested to assure its structural adequacy. The development testing indicated a need to saturate the seal carrier molding with talcum. This reduced the coefficient of friction so that the necessary scrubbing and elongating could take place without breaking the seal.

The completed pressure vessel will be hydrostatically tested to 11,500 psi at the factory. After installation at San Diego, a final hydrostatic and leak test will be performed.

ANYTHING! To save $300,000 . . .

White Amur Fish Offered Pasture at NTC Orlando



C. W. BENNETT,
Senior Entomologist
and
M. P. MARKS,
Entomologist Trainee

• Charleston, S.C.

Fish stories are usually greatly exaggerated.

A story concerning a fish of Asian origin brought into this country for the specific purpose of eating water weeds would ordinarily be difficult to accept. Although it may sound like a wild fish story, it is true that the white amur (i.e., chinese grass carp, *Ctenopharyngodon idella Val.*) *has* been imported for just such a purpose.

The uncontrolled growth of aquatic plants that plague many navigable and recreational waters of the United States, particularly in the Atlantic Coast and Gulf Coast states, has been an increasing problem during the past 15 years. Environmentalists have recently raised serious questions about the continued use of chemical controls in aquatic environments. In response to this situation, various federal, state and academic investigators have intensified studies of the use of alternative biological controls, including the use of the white amur.

The white amur is a fish of the carp family, and is native to China, Manchuria and Siberia. It has long been known for its food value but only recently has been widely accepted as a voracious feeder on aquatic plants. The fish has been used in the Soviet Union, Poland, Czechoslovakia and India for both weed control and food purposes.

Five years of research in this country has provided the background knowledge for limited use of the white amur. Researchers feel that the fish could develop into not only an effective biological control agent for water weeds but also a source of dietary protein and a challenging sporting fish.

In diet studies, the white amur gained well on submerged water weeds and, in fact, did better on weeds than on commercial fish foods. Under ideal conditions, the fish will gain up to ½ pound per month and average a gain of 3½ to 6 pounds per year.

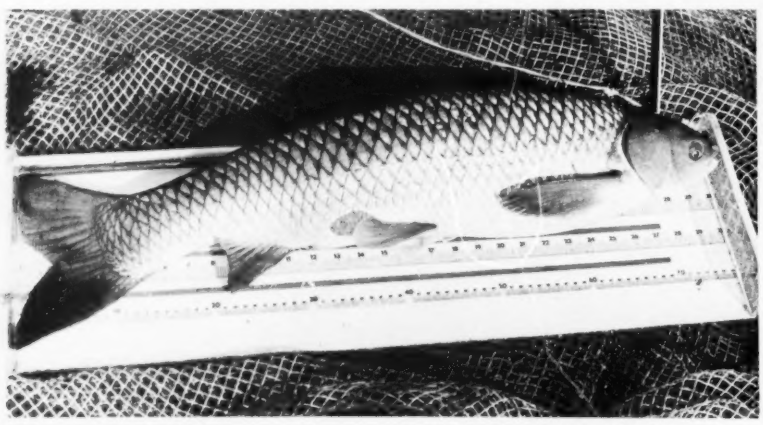
Under test conditions, it has been observed to eat more than its own weight in weeds per day. The growth rate of the fish appears to depend mainly upon the climate and available food supplies. Faster growth rates are directly related to warmer climates.

The white amur's adaptabiilty is demonstrated by the fact that it can tolerate wide temperature extremes, considerable changes in water salinity (up to 12%), significant oxygen deficiencies and a number of common diseases. It is felt that the fish will adapt to most areas of the United States.

The spawning requirements of the white amur are quite restrictive. Only two instances of spawning outside its native habitat have been reported (Tone River in Japan and the Al kung Lien Reservoir in Taiwan). However, the fish can be artificially induced to spawn by injecting hormones into the female. The obvious advantage of breeding the fish under controlled conditions would be to regulate its numbers in a particular area.

An agricultural research service botanist, Dr. Robert D. Blackburn, in cooperation with the Florida Agricultural Experiment Station, Fort Lauderdale, and the Florida Department of Natural Resources has done much of the basic study in the use of the white amur for aquatic weed control in the State of Florida. The work of Dr. Blackburn and others has progressed to the stage that limited field testing is now feasible.

Lake Baldwin, located at the Naval Training Center in Orlando, Florida, has been proposed as an initial test site in the State of Florida. Southern Division, Naval Facilities Engineering Command, is extremely interested in this project. To date, chemical control materials have cost NTC Orlando over $300,000. Introduction of the white amur would possibly give permanent water weed control at a minimal cost. Negotiations are presently under way between State and Federal agencies responsible for final approval.



White amur, variously known as chinese carp or Ctenopharyngodon idella Val. Q, possesses an appetite for weeds that may be put to use in underwater defoliation at NTC Orlando.

Naval Construction Force REVIEW

By LCDR J. L. HORACEK
Head, Seabee Capabilities Branch

• Alexandria, Va.

The island of Diego Garcia continues to provide a fascinating challenge to its Seabee inhabitants. NMCB-74 completed several significant projects such as BOQ 2 and the sewage lagoon, and neared completion of others such as the power plant, prior to being relieved by NMCB-4 in November.

Carrying on the reputation Seabees enjoy at this isolated site, NMCB-4 continues work on the antenna fields, the medical building and standby power plant and have commenced rip-rap operations at the POL causeway.

Late December saw NMCB-3 completing many homeport training projects, winding up technical and military training and deploying advance parties to Roosevelt Roads, Bermuda, Andros Island, and Guantanamo Bay. Meanwhile NMCB-10 was putting finishing touches on projects in Puerto Rico, as well as a boat basin and fuel facility mooring in Bermuda and the range support shop on Andros Island. NMCB-3 relieved NMCB-10 at Roosevelt Roads in early January.

Shortly after arriving in Port Hueneme ceremonies were held to present the FY-1973 Peltier Award to the Men of Ten. The Society of American Military Engineers award was presented by RAdm E. J. Peltier, CEC, USN, Retired, former Chief, Bureau of Yards and Docks and Chief of Civil Engineers.

Wet winter weather, while hampering progress, did not stop the work of NMCB-40 located at Rota, Spain. The air cargo apron consumed the largest share of available manpower at the main body site. At the detachment sites, Crete remained the highest priority and two BOQs and one BEQ were completed and occupied. La Maddalena hosted a service club opening party after the club was completed on 21 December. Other detachments were completing an enlisted club warehouse at Nea Makri, Greece; a dispensary at Holy Loch, Scotland; a generator replacement at Todendorf, Germany; and projects in Sigonella, Sicily, to provide no-break power and barracks rehabilitation.

In the Pacific, the NMCB-62 detachment at Yap returned to Guam after completion of soil cementing of a 4,000 foot coral runway. The Adak detachment continued work on the hobby shop which is scheduled for completion this summer.

The successful deployment of Seabee Team 0522 aboard the *USS Sanctuary* to participate in *Operation Handclasp* highlighted the NCF civic action program. Responsible for giving technical assistance and practical experience in construction to civilian work crews, the NMCB-5 team provided valuable know-how in the South American countries of Colombia and Haiti. The four remaining Seabee Teams from NMCBs 3, 40, 62 and 133 are continuing their civic action work in the Trust Territory, Pacific Islands of Yap, Ponape, Dublon, and Koror.

While serving as the Pacific Fleet alert battalion on Okinawa, NMCB-5 started construction of the enlisted men's club at Camp Shields, and continued work on perimeter road and fencing. Details from NMCB-5 were also working on personnel support facilities at Iwakuni and Subic Bay. They also completed helicopter support facilities at Sasebo.

Rounding out deployed battalions, NMCB-71, in Antarctica, is proceeding smoothly on its construction projects. The good weather of midsummer is playing a role as it enables the free flow of materials from McMurdo to the South Pole. The skin of the McMurdo Power Plant addition has been installed and progress on all projects is reported to be going well.

CBMU 302 commenced construction on the Public Works Industrial Facility at Subic Bay. This is the largest construction project the unit has undertaken since being homeported at Subic Bay.

In January, ACB-1 dispatched Detail Hotel of one officer and 30 men to Pearl Harbor with four causeway sections, a warping tug, a crane, a rough terrain forklift and five dump trucks. The detail is assisting in the environmental cleanup of Pearl Harbor, concentrating in the West Loch section, including the restoration of Lau Lau Nui Island. They have found their crane mounted causeway sections a unique asset in removing old piles. They are also removing dilapidated piers, sunken craft and miscellaneous structures.

ACB-2 was involved in numerous projects at the Naval Amphibious Base, Little Creek, Va., including work for the amphibious museum, miscellaneous welfare and recreation projects, and an interesting project salvaging 100 personnel landing crafts for scrap metal.

In December, ACB-2 was involved in emergency beach salvage operations when three barges broke loose from a civilian tug in the Chesapeake Bay. Working with the Coast Guard, the barges were secured during heavy weather to prevent navigational hazard and damage to bay bridges.

ACB-2 had three causeway fuel teams in the Mediterranean, and one in the Caribbean last November and December. They also deployed teams to Camp Garcia on Vieques Island in support of amphibious operations.

The 17 CBUs are continuing to work on many projects. Recently completed projects include tennis court lighting at Oceana, Va.; playground equipment in Charleston and Treasure Island; community centers in Hawaii; and recreational and hobby shops in Newport and San Diego. Larger projects are also underway and nearing completion such as the mobile home parks at Cecil Field, Mayport, and Memphis. The efforts of the CBUs have contributed greatly to the success of the Navy's habitability program.

Navy to Clean Up Drydock Wastewater Discharge

By WAYNE OLSEN
Sanitary Engineer, WESTDIV
• San Bruno, Calif.

Until recently, a large source of wastewater at Naval shipyards, the water discharged from Navy drydocks, has been ignored by pollution abatement agencies. The first comprehensive study of these discharges completed in October 1973, was conducted in two simultaneous phases at Long Beach, Hunters Point and Mare Island Naval Shipyards in California and Bremerton Naval Shipyard in Washington by a contractor, Engineering Science Incorporated, under the direction of the Western Division, Naval Facilities Engineering Command. One phase was a general, overall review of drydock operations in relation to water quality. The other phase was an intensive water quality study on one drydock through an entire ship refitting.

The Environmental Protection Agency (EPA), which is administering the National Pollutant Discharge Elimination System, is responsible for issuing wastewater discharge permits for Federal agencies. EPA Region IX (California, Nevada, Arizona, Hawaii, Pacific Trust Territories) is issuing discharge permits with requirements on both flooding water discharge and process water discharge.

Flooding water is that used to float the ships into and out of the drydock. After the ship is in position in the dock, the flooding water is pumped out of the drydock by dewatering pumps with capacities up to 150,000 gpm. These discharges are not considered to be a significant problem and there is no need to treat them, other than completely cleaning up the drydock before flooding.

Flooding water discharges do have one interesting problem: in shallow bays, the flooding process takes in mud from the surrounding area due to the turbulence created by the flooding, when the water becomes still, the drydock acts as a giant settling chamber. When the water is pumped out, only a small amount of sediment is returned to the bay. Fire hoses have been used to flush the mud from the drydock floor, but EPA does not accept this procedure. Once the mud is removed from the environment, the remover must dispose of it as he would any other solid waste from his operations. EPA claims that its position has been supported in court cases.

Process water is generated during operations in a dewatered drydock. The process water is generally pumped directly to the bay by sump pumps with capacities of 300 to 1,500 gpm. The maximum treatment it receives, if any, is some solids removal by sand traps, and free oil removal by gravity separation at the sumps. The contractor's study found that process water quantities could be as high as 100 gpm in a large drydock with an aircraft carrier under repair. The sources were 28 gpm from dust suppression devices, 23 gpm from the ship's air conditioning, 8 gpm from wheeler machines, and the rest from miscellaneous sources.

All this waste water flows through the collection of debris on the bottom of the drydock, which is composed mostly of sand blasting residue. Table 1, Compositions of Formula Paints used on Navy Ships, gives some idea of the composition of this residue on the bottom of the drydock. Table 2, Quantities of Most Frequently Applied Paints at Puget Sound Naval Shipyard, shows the quantities of paint used to paint the hulls of ships. Sandblasting shatters the paint, producing very small particles of paint to fall into any water in the drydock. The study showed that under current operations, process water does contain excessive amounts of floating and suspended solids and heavy metals (copper, chromium, lead and zinc).

EPA Region IX has requested interim operating procedures to minimize process water quantities and to reduce the discharge of process water into drydock debris. They also would like eventual elimination of any direct discharge of process water to the environment.

WESTDIV is presently reviewing EPA requests on drydock discharges. Meanwhile, the 120-page report by the contractor, entitled "Pollutional Effects of Drydock Discharges" contains much information which is helping in implementing discharge permit requirements and in developing pollution abatement projects. The report includes 16 pages of analytical data on the chemical composition of drydock wastewaters, including pollutant mass emission rates. Any one concerned with drydock discharges should read it: a copy has been distributed to each engineering field division.

CEL Devises Wastewater Disposal Mode for Sub Base

• Port Hueneme, Calif.

Threat of an operational shutdown of the Naval Submarine Base New London, Groton, Conn. was abated by two specialists from the Civil Engineering Laboratory, Port Hueneme.

Adolph Bialecki and John Williams, senior research chemical engineers of the Environmental Protection Systems division of CEL, devised a method for disposing of oily waste waters which had accumulated to 95% of the capacity of two receiving tanks (750,000 and 125,000 gallons) into which were pumped the discharges from submarine bilges, sub tenders, Navy industrial shops and other sources. The tanks were expected to overflow in three weeks and tightened pollution control regulations forbid dumping into the ocean or on adjacent land sites, as was done before.

To preclude a shutdown of base activity and to avoid the alternative of paying 10 to 12 cents a gallon to a commercial firm to remove and dispose of the waste — at a total cost approaching $80,000 — CEL was asked to evaluate and recommend an economical, and speedy, solution.

Bialecki recommended that the contents of the tank first be selectively analyzed for contaminants, then the oil skimmed off the top and sold. During natural gravity settling in a tank, about 20 percent oil floats on top of 80 percent waste water. Within six weeks, some 150,000 gallons of oil were skimmed and sold for about a cent a gallon.

Bialecki also suggested the waste water, containing small amounts of oil and substantial amounts of sulfides, be further treated for their removal. The sulfides were removed by adding hydrogen peroxides to the oily wastes before they were pumped into an oil-water separator.

After treatment the water, no longer a pollution threat, was discharged into the local sewage treatment plant.

Williams was instrumental in setting up the oily water separator system on loan from the Naval Ship Research and Development Center, Annapolis, Md. and he also trained public works personnel to operate it. Performance data is being collected on the separator unit to permit development of future oily waste water treatment systems.

NAVFAC Named AEC License/Radiation Design Contact

By ROBERT E. CARLTON, P.E.
Supervisory Nuclear Engineer, Nuclear Power Division
• Alexandria, Va.

The Chief of Naval Material has designated NAVFAC to act in his behalf as a central point of contact with the Atomic Energy Commission (AEC) to coordinate the acquisition of AEC licenses and to review the design of new facilities determining the adequacy of rediation protection features.

The Navy radiological involvement ashore includes approximately 300 licenses, 5,000 radioactive sources, 800 x-ray machines and 20,000 user personnel.

Licenses are issued to Navy activities authorizing the receipt, possession, use and transfer of radioactive materials. Use of these materials spans a broad range of applications. An example of a relatively simple application is the use of calibration sources in radiac instrumentation. A more complex application is the laboratory testing of radioactive materials in both sealed and unsealed form. Another technically-advanced application is the safe packaging of nuclear power plant reactor cores for transportation.

Examples of broad-scope usage are the operation of radiographic equipment throughout the Navy and the operation of radioisotope power generators in terrestrial and underseas missions. Although the license, itself, is a legal document and the process of issuing a license is an administrative action, the basis of license issuance is a thorough technical review.

There is probably no other license-issuing process that is as thorough and technically complex as that of the nuclear energy field.

A typical license review involves a NAVFAC assessment of the user's radiation protection program. This review includes an evaluation of the user's qualifications by virtue of training and experience, the radiation protection standards to be employed, the monitoring and control measures to be instituted, identification of the radioactive materials to be used and the procedures for use, personnel health protection provisions, accident and emergency plans, and administrative record and report provisions.

NAVFAC design reviews of facilities with nuclear or radiological features are conducted principally for the dual purposes of providing both personnel protection and cost-effective shielding designs.

Approximately $6 million per year in new construction is involved for the following typical facilities: dispensaries and dental clinics using x-ray machines, installations operating accelerators, activities conducting radiography operations, and activities using radioactive materials for other purposes such as training or radioactive waste storage.

These facility design reviews typically involve an assessment as to whether the facilities are safely designed with respect to such features as storage, disposal, shielding, monitoring, ventilation, decontamination and control.

Licensing and design reviews for radiation safety reduce the risk that personnel could become exposed to radiation in excess of allowable occupational radiation exposure limits, reduce the risk of an uncontrolled release of radioactive materials to the environment and preclude the installation of potentially over-designed, hence unnecessarily costly, shielding.

Environmental Impact Statement Guidelines Revised

By PAUL F. NADEAU
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• Alexandria, Va.

The National Environmental Policy Act (NEPA) requires all Federal agencies to prepare environmental impact statements (EIS) in connection with their proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. The act also established the Council on Environmental Quality (CEQ), to monitor the various Federal programs established to comply with the act. Executive Order 11514 requires the council to issue guidelines to Federal agencies for preparation of statements. A number of revised CEQ guidelines, published 1 August 1973, have a potential effect on the Navy.

The principal changes in the revised guidelines are in four major categories. First, *EISs should be prepared earlier in the planning process.* This would require the Navy to consider the environmental effects of a proposed action during the initial planning stages of that action. For example, an initial evaluation of the environmental impact of a proposed military construction project should be made at the 11000|4 stage of that project. A more detailed environmental assessment would then be prepared when that project developed to a budget year program. Related to early consideration of the environment is the added emphasis placed on preparation of EISs for an entire program rather than for individual increments. This would require preparation of an increasing number of generic-type statements for multiple increment projects, and develop an increasing awareness of the environment during master plan preparation.

The second change requires *increased public participation* during the EIS process. This will encourage Federal agencies to promote public participation. These procedures should include an appropriate early notice system to inform the public on decisions to prepare impact statements and they should make information readily available to the public. Lists of projects requiring no impact statements and projects on which statements are being prepared will also be required, and made available to the public upon request.

The third change adds two new elements to the EIS format. One requires *a discussion* of "the relationship of the proposed action to land use plans, policies, and controls for the affected area." If a conflict should arise in this relationship, the Navy must describe its efforts to reconcile its proposed action with the land use plan. The other element allows the agency to present "an indication of what *other interests and consideration* of Federal policy are thought to offset the adverse environmental effects of the proposed action" to the reader of the statement. Care must be taken in preparing this section so that emphasis is not shifted from environmental effects to social or economic impacts.

Finally, the fourth change emphasizes the importance of the alternatives section of the EIS format. Each Federal agency is required to *explore all alternatives* to a proposed action that would prevent or minimize the adverse environmental impact.

THINKING: An Occupational Necessity

By E. DONALD POUNDER
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Southern Division, NAVFAC
• Charleston, S.C.

Thinking. It doesn't take a genius to think creatively. It does take consecutive application of the mind, and that's one of the most difficult performances in life. If you doubt it, try this exercise right now, or at home tonight: hold your mind strictly to one abstract subject for 60 seconds. If you can do it, you're a very superior creative thinker.

Possibly, then, one of the most important uses that we can put our minds to is "*thinking*". Where we fail to give thought to what we say, it generally falls pretty flat.

Let's continue some thoughts concerning "thinking". Alexander Hamilton, one of the greatest constructive thinkers in American statesmanship, once said, "All the genius I have lies in this: When I have a subject at hand I study it profoundly. Day and night it is before me. What people term the 'fruit of genius' is instead the fruit of labor and thought."

Reduced to fundamentals, thinking is nothing more than examining what you know about a subject and looking for what, to you will be the new relationships among these facts. In the thinking process, you take your subject apart, analyze the parts and put them back together again; not as you would the parts of a motor, but in a new arrangement that meshes.

There may be reluctance to accept your new thought. Your boss and your work associates may put together a thousand good reasons why it won't work. It has been tried before and failed. It will offend some militant minority. It will cost too much to apply, and, if no other objection can be raised, "it's a good idea, but this is not the right time to try it."

Every time you ask yourself "isn't there a better way of doing this?" you are doing creative *thinking*. Follow through on the question.

It was a French physician who invented the stethoscope, the instrument with which your doctor listens to your heart and lungs. Do you know what caused the French physician to get the idea for his invention? He was passing a school and saw two boys using a teeter board for a new purpose: one held his ear to one end of the board while the other tapped the opposite end with a rock. From this observation and creative *thinking* resulted the stethoscope.

How do each of us go about benefiting from some of our thoughts? One possible way is when an idea hits, reach for a pencil and pad and jot down the idea. I'm sure that every person who reads this has had ideas during the middle of the night that seemed to make a problem rather simple; but when the morning came, the idea had slipped from his mind. Thoughts are the most fleeting ghosts in the world, they can be lost just as quickly as they appeared. Now, after you have had the flash of inspiration, this is just a beginning. You must get down to the laborious task of putting foundations under those air castles. And that is where the hard grubby work comes in. Let no one deceive you, thinking — and thinking constructively — is hard work.

Let habit help you think. Each of us is but a bundle of habits. Habit simplifies our living and thinking. If we had to think through every step in today's routine as we learned it in the first place, a whole day might be consumed in bathing, dressing, eating breakfast and just getting to our places of work. The more one can automate his mind to handle the repetitive details, the more his higher powers of mind will be set free for their own proper work.

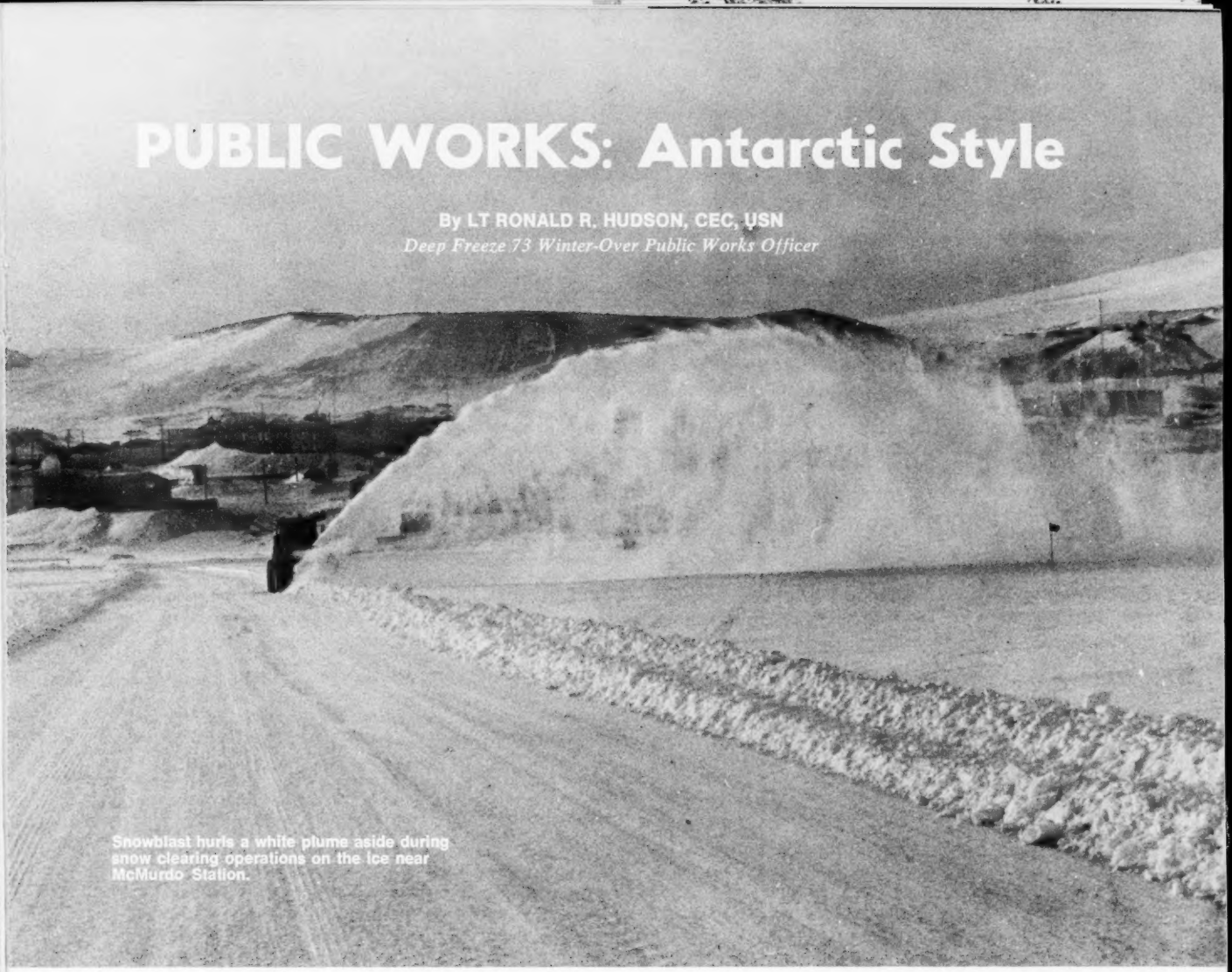
Psychologists tell us that even though we are harassed by many problems, there is no possibility of wearing out our minds. The more the mind is used, the easier thinking becomes.

The thinking process is just like any other process. When you're working on a project in its creative stages, don't think consciously about thinking. You have to let your mind relax and let your mind run without using spurs. Your mind, when well trained, can be compared to the well-trained body of an athlete. When an athlete, a golfer for instance, grits his teeth and tries extra hard, that's when his game usually turns sour. It is when he is relaxed and lets the automation process take place that he shoots his best game. Don't misunderstand though, he is constantly thinking about his golf, but in a relaxed manner that allows his body to work like fluid motion.

Keep your eyes and ears open to outside suggestions; listen to the prompting of your inner self. When wrestling with a problem, don't let yourself be taut, but practice, practice, patiently. All things come to him who waits and *thinks* the problem clearly through. Thinking will help make your job easier, and it might well lead to a better job in the future.

PUBLIC WORKS: Antarctic Style

By LT RONALD R. HUDSON, CEC, USN
Deep Freeze 73 Winter-Over Public Works Officer



Snowblast hurls a white plume aside during snow clearing operations on the ice near McMurdo Station.

• Crane, Ind.

Antarctica is called a land of challenges and certainly how true that is for the typical Civil Engineer Corps Officer or Seabee wintering over at one of the four year-round bases maintained on the continent. During Deep Freeze 73, many new and innovative ideas were tried with success attributable to Seabee ingenuity and the ability to accomplish a given task without the necessary tools, or what is sometimes called "jury rigging".

The public works minor construction function at McMurdo Station, largest of all bases in Antarctica, is the job of the Seabees. The normal winter-over complement is one or two CEC officers and 60 Seabees. All phases of base maintenance, ranging from power production to waste water disposal, are handled by these men. In addition to the daily maintenance problems, numerous minor construction projects are accomplished during the winter period lasting from February until early October.

Antarctica's winter creates problems which render standard operations inadequate. The sun sets in mid-April and does not rise again until mid-August, leaving much of the winter in total darkness. The only light for four months is what a man can carry or generate. The temperatures often plummet 40 to 60° below zero, with wind chill factors in excess of 100° below zero.

Deep Freeze 73 Winter-Over was a season for tradition-breaking methods with remarkable accomplishments. Among these was the introduction of fiberglass-reinforced epoxy pipe for use as a salt water line to supply the water distillation units. Copper pipe previously used quickly eroded due to its reaction with salt water. It was insulated with the traditional fiberglass material and steel jacketed. Polyurathane insulation and aluminum jackets on the epoxy pipe reduced the weight by 80 percent.

The 1,000 foot long salt water line gained 300 feet in elevation, with some slopes up to 60%. Needless to say, the weight reduction eased the installation by utilities men working in 18 hour stretches. The new four-inch line delivered 20 gpm more than the old system.

A new intake house was also installed in the salt water system. It was placed on a manmade peninsula which exposed it to the Antarctic weather. Previous houses built in conventional rectangular form had acted as a windbreak, causing snow accumulation and eventual collapse under excessive loads. The new silo-type structure remained snow-free due to its circular shape. The intake house remained snow-free for the entire winter, eliminating another maintenance problem.

Primary among the projects was construction of an ice wharf in Winter Quarters Bay capable of handling deep

Ice walls formed for ice wharf at Winter Quarters Bay. (Left) Plywood forms were filled with snow and water, then stripped away when ice block was solidified.

D-4 dozer working the ice road to Marble Point cleared rugged ice obstructions and filled cracks.

draft ships. Initial design envisioned a trapezoidal shaped wharf 600 feet long projecting from 150 to 200 feet into the bay. In order to withstand the summer "heat" of 35° to 38°F, it has to be 25 feet thick. Various methods were explored until a successful and practical one was decided on.

Construction began in early winter when two feet of ice had already covered the bay. A vertical ice wall was built along the pier side to facilitate the docking of ships. Plywood forms were manually filled with snow and water. When the forms were stripped, a wall four feet high remained. The other sides were pushed-up snow, using a convertible Caterpillar D-4. After the walls were formed, water was pumped into the form from eight pumps located in three houses outside the walls. The three-inch discharge lines would occasionally freeze solid in 20 minutes even while carrying over 225 gpm.This, and other problems, were solved and the desired ice thickness was built up in layers. As the layers increased the wharf sank. When finished, the wharf weighed 75,000 tons and, hopefully would last indefinitely.

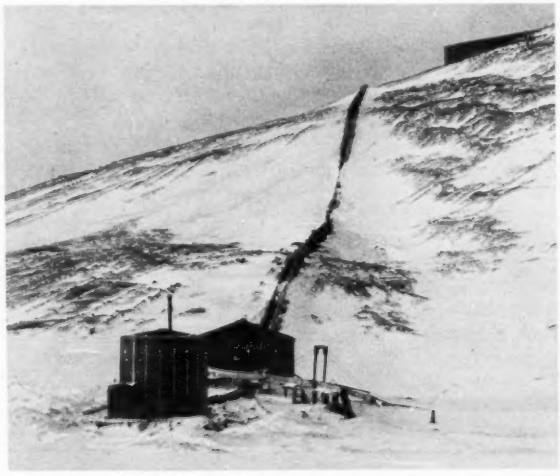
Deep Freeze 73 was the first year since 1962 that primary power for McMurdo was supplied from the diesel power plant after the nuclear reactor used in the intervening years was shut down and the diesel plant was upgraded from stand-by to primary power source. While in an on-line status, major overhaul became necessary on one of the four 500 KW units. Since the McMurdo demand fluctuated between 900 and 1300 KW, the overhaul was performed while the other three generators were on-line. During the overhaul, a short developed in one of the three other generators. Initial trouble shooting did not reveal the problem so strict energy conservation measures were effected to reduce the base load to 800 KW and a maximum of 900 KW during peak periods. The overhaul was stepped up, with two crews working around the clock. In three days the trouble — a complicated short — was found and corrected. More rewarding was the completion of the overhaul within a week due to prior planning and plain hard work by the shop head and the crews.

One of the largest efforts programmed for Antarctica in recent years is the Dry Valley Drilling Project, planned by a three-nation task force. The dry valleys are 60 miles across the sound from McMurdo. Many of the supplies

were to be moved over ice during the winter in order to save valuable helicopter time. Plans were laid for across-the-ice movement of 50,000 gallons of JP-4 jet fuel and diesel fuel, supplies, and materials to a depot at Marble Point. The most efficient method proposed was by wheeled vehicles, which would require a 60 mile road to be built and numerous ice cracks to be bridged. The road was built by removing loose snow, breaking up protruding ice and bridging ice cracks up to 35 feet wide.

Then began the movement of material. As it was moved, a constant eye was turned to the weather which could destroy the entire road in a matter of hours. The transfer continued around the clock, much of the time in total darkness. Ten thousand gallon fuel bladders were air tested, and then shipped to the depot at Marble Point where the fuel was to be stored. Success continued, bolstering morale of the troops who volunteered and worked 30 hours at a stretch.

The men said "Thank Heaven" and "Good Riddance" when the operation was complete, but they were proud of what they had done. Most of them had the same to say for the entire winter's operations. The Seabees success in Deep Freeze 73 was due to the spirit of those who spent long, hard hours and extra effort in making it a success. Special credit should go to E01 Robert F. Wilson, UTC James Wallace, MRC Joseph Martin, SW1 James Affeldt, CMC Quentin J. Wilson, CM1 James Baker and many others who surpassed the standards of good effort.



Cylindrical salt water intake pump house and steeply ascending salt water pipe line to distillation units.

NAVAL STATION CHARLESTON, S.C.
NAVAL AMMUNITION DEPOT OAHU, HAWAII
NAVAL AIR FACILITY SIGONELLA, ITALY
NAVAL STATION SUBIC BAY, PHILIPPINES
NAVAL RADIO STATION CUTLER, MAINE

• Alexandria, Va.

The winners in the Navy's second Bronze Hammer Award competition were announced by Adm. Elmo R. Zumwalt, Jr., Chief of Naval Operations. In announcing the awards Adm. Zumwalt commented that, "resourcefulness and ingenuity" were the words most often used in describing the accomplishments of the winners.

Four classifications for the activity award were established based upon the total enlisted strength of the shore activity, its tenants and the availability of a Naval Construction Battalion Unit (CBU) to assist. The four categories and their winners are:

• Activities with an enlisted allowance *greater than 1,000* with a CBU in the immediate area. Winner was the Naval Station, Charleston, S.C. Runner-up was the Naval Air Station, Alameda, Calif.

• Those with an enlisted allowance *less than 1,000* with a CBU in the immediate area. Winner was the Naval Ammunition Depot, Oahu, Hawaii. Runner-up was the Naval Weapons Station, Concord, Calif.

• Those with an enlisted allowance *greater than 1,000* with *no CBU* in the immediate area. Tied for first-place in this category were the U.S. Naval Air Facility, Sigonella, Sicily and the U.S. Naval Station, Subic Bay, Philippines.

• Those with an enlisted allowance *less than 1,000* with *no CBU* in the immediate area. Winner was the Naval Radio Station, Cutler, Me. Runner-up was the Naval Air Facility, El Centro, Calif.

A Special Award category was established for any Navy organization, tenant activity, community group, fleet unit, etc., not having primary responsibility for real property management of personnel support facilities but which made significant contributions to the Navy's "Self-Help" program and were deserving of recognition. Recipient this year is the Naval Air Technical Training Center, Lakehurst, N.J.

A total of 19 nominees was considered for the Activity Award. Judging was based upon effort made in the allocation of resources; the priority of attention given to personnel support, welfare and recreational facilities; the quality of completed improvements; and the ingenuity exercised in the execution of the program.

The overall Navy Self-Help Program is administered by RAdm. A. R. Marschall, CEC, U.S. Navy, Chief of Navy Civil Engineers.

The Bronze Hammer Award, established by the Chief of Naval Operations, went to those Navy activities which, by utilizing available resources, imagination and ingenuity, made the most outstanding contributions to improving the quality of Navy life through their own "Self-Help" efforts with or without the assistance of Naval Construction Battalion Units— the Seabees. The objective of the Self-Help Program is to make a maximum impact toward restoring the fun and zest of a Navy career and to reverse declining retention rates through the continuing enhancement of personnel support, welfare and recreational facilities.

Building Systems Cost Guide Aids Estimating

By JEFFERSON L. DEAN
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• Alexandria, Va.

Military construction cost estimating can basically be categorized as: (1) conceptual estimating for planning; (2) program estimating for budgeting; and, (3) detailed estimating, based on plans and specifications, for project estimating and cost control.

Historically, the conceptual estimate has suffered from a lack of definition and accuracy. This type of estimate is normally lump sum and based on an estimated cost per square foot. The budget estimate, though having greater definition, detail and accuracy than the conceptual estimate, also suffers from a lack of accuracy and sometimes continuity. The detail estimate based on plans and specifications is the most accurate estimate produced. This type of estimate cannot be made without plans and specifications. If the estimate is made and the project cost is not in line with the budgeted amount, redesign to bring the project cost in line with the budgeted dollars can be costly or impractical. This type of estimate also suffers from a lack of continuity.

Building systems estimating is a method of estimating which produces an estimate based primarily on the geometry of the structure. Once the configuration of the structure is established at the planning stage, any changes in configuration of the structure produces corresponding changes in the building systems costs. Any changes can be tracked and corresponding cost changes can be made from the conceptual estimate through the budget estimate to the final project estimate.

The Naval Facilities Engineering Command is currently developing a building systems cost guide and building systems estimating capability under contract. Building construction is divided into the following systems:

CODE	DESCRIPTION	UNIT OF MEASURE
0100	Foundation System	Bldg SF
0200	Interior Column System	Column LF
0300	Floor System	Bldg SF
0400	Roof System	Waterproofed SF
0500	Exterior Wall System	Wall SF
0600	Interior Wall System	Wall SF
0700	Exterior Glazed Opening Sys	Opening SF
0800	Door System	Door SF
0900	Specialty System	Bldg SF
1000	Plumbing System	Fixt
1100	Mechanical System	MBTV/Tons AC
1200	Electrical System	Bldg SF
1300	Special Equipment	Bldg SF
1400	Conveying Systems	Bldg SF
1500	Supporting Facilities	Site SF

These NAVFAC building systems at the planning level will be divided into subsystems at the program level and into nuts and bolts details at the plans and specifications level.

The building systems estimating method allows anyone, who knows building construction and has a systems cost guide or historical cost file of building systems costs data, to select from many possibilities the building systems or subsystems found in a particular facility and estimate the cost of the structure from excavation to roof. The applicability and accuracy of this method of estimating is dependent on the accumulation and documentation of cost data by building systems and building subsystems, the level of detail of the cost data, the time allowed to make the estimate, the availability of plans and specifications and the ability of the user.

NEW MILITARY CONSTRUCTION GOALS REVIEWED

By E. G. YEMINGTON
Program/Technical Division, NAVFAC
• Alexandria, Va.

Military construction programming begins with the selection of the most urgent facilities' deficiencies requiring correction within an estimated funding level for a particular year. Determination of the actual funding level involves the annual submission and justification of a proposed program through the Navy Department, the Office of the Secretary of Defense, Office of Management and Budget, and the Congress for enactment into public law.

Executions of these functions through the appropriation act is the responsibility of NAVFAC's Assistant Commander for Military Construction Planning.

Historically, the military construction appropriation has averaged about 2% of the total Navy budget. In dollar amounts, the annual average from FY 1969 through FY 1974 has been $417 million. Regardless of this relatively small size of the military construction appropriation, it is one of the most difficult to manage because of its complex, heterogeneous nature.

Also, but not peculiar to the military construction appropriation, there is an overlap of program structuring and reviews which make it difficult to reliably forecast project content of annual programs until Congress completes its actions.

For example, Congress just recently completed its review of the Fiscal Year 1974 budget estimate. Some project deferrals had to be incorporated into the Fiscal Year 1975 budget estimate on which OSD had completed Program Budget Decisions in December 1973 and was submitted to the Congress in February. Project deferrals from both these circumstances will impact on the composition of the proposed FY 1976 program which is nearing its final formulation stages for review by the Navy Military Construction Review Board in early summer.

Despite any adverse conditions, there has been a high degree of success in achieving certain military construction goals. In view of an all volunteer force, facilities' deficiencies such as barracks, recreation, and training are being corrected at accelerated rates. The barracks situation is being alleviated to an extent that special emphasis on these facilities will be reduced beginning with the FY 1976 program.

The future looks reasonably active. The FY 1975 budget submission to OSD was for $756 million and approved at $644 million. The program to correct medical facilities' deficiencies is getting started with the total dollar amount for FY 1974 through FY 1979 estimated to be $670 million.

The pollution abatement program is expected to continue to receive special amphasis with the programmed amounts for FY 1975 through 1978 being $307 million.

Finally, the *Trident* program is well underway with military construction funding now estimated to be in excess of $500 million by fiscal year 1979.

Advice of Counsel

"... the king can do no wrong ..."
— Blackstone

USES/ABUSES OF POWER

No Federal government officer is king, but many participate in sovereignty by delegated authority.

In our democratic constitutional government, authority begins in the Constitution, is spelled out in statutes and regulations, and is delegated by those with statutory or regulatory authority. A Government act may be challenged as unconstitutional, beyond the statutes, or not within the power of the particular officer.

But even exercise of power within authority may be successfully attacked. Although a Government officer has authority, he must usually set forth in rules how he will exercise that authority and then must abide by those rules.

Rules and regulations enable those affected to learn what they must and must not do, and failure of Government officers to follow their own rules is not due process of law. Rules assure equal treatment among all affected. And rules would not achieve these purposes if the officer, though possessing the authority, were free to disregard them.

In making the rules the officer must publish drafts and give opportunity for comments from those affected. In rendering decisions applying rules, an opportunity must be afforded the persons affected to present their cases. The Administrative Procedure Act also provides review in the courts. Application of this act to proprietary matters like Government contracts and property has recently been much debated.

To provide information to citizens, the Freedom of Information Act requires organizations, rules, and decisions to be published and available. Anyone may require a Government officer to produce, with only a few limited exceptions, identified documents. The Comptroller General, a part of the legislative branch, serves as an investigating office and ombudsman.

If a Government officer is careless and causes injury while acting within his authority, he is usually, but by no means always, excused from responsibility for tort damages.

A Government employee has been held liable for damages by reproducing a copyrighted map. For libel and slander, he has an absolute privilege, excusing even malicious statements, but he must be speaking on Government business. A statute was necessary to protect Government drivers in accidents, and proposals pend to extend the Government's assumption of responsibility to other torts.

In any event, the Government officer may be obliged to defend himself. And as news stories show, he may be charged with crimes.

"Uneasy lies the head that wears a crown" —

— Shakespeare

OPERATION: Hummingbird
TESTS SET FOR HELICOPTER NOISE LEVELS

By D. W. KURTZ
Standards and Criteria Branch, NAVFAC
• Alexandria, Va.

The Winter 1973 issue of the Navy Civil Engineer reported on the "Noisy Goat" test program during which noise measurements were conducted on Navy and Marine Corps fixed wing aircraft. As reported then, this data will assist in developing a Noise Exposure Forecast System for use in calculating environmental noise forecasts for air installations.

Fixed wing aircraft, however, comprise only part of our air fleet, with the remainder being helicopters or rotary wing aircraft. NAVFAC, with technical assistance from the Navy Aircraft Environmental Support Office (AESO), and the Army Construction Engineering Research Laboratory (CERL) jointly have developed a noise measurement test program for helicopters. As this is the first comprehensive noise measurement program developed for all military helicopter types, the proposed procedure underwent a thorough trial run and de-bugging exercise at Fort Rucker, Ala. in March 1974, prior to commencing fleet/wing aircraft measurements.

Noise measurements of Navy and Marine Corps fleet/air wing helicopters will be conducted over a two week period during June in a test program designated "Operation Hummingbird." A. D. Lewis, head, Standards and Criteria Branch, NAVFAC was designated as test director. The Marine Corps Auxiliary Landing Field, Camp Pendleton has been selected as the test site for eight different helipcopter models selected for the test program. These tests, when combined with separate measurements to be made of Army helicopters, will result in representative readings for all major helicopter models in the military inventory. The actual field measurements and data analysis will be performed by a six-man team from CERL with AESO personnel on site as technical advisors to the test director.

Operation Hummingbird will complete the Navy/Marine Corps effort to obtain comprehensive noise data for our aircraft. With the test completion, the machinery (in this case, a computer containing all major aircraft noise characteristics) will soon become available to accurately predict noise levels and print noise contours for any Navy/Marine Corps air installation.

Excursion train halted on high bridge of the famous Georgetown Loop of Georgetown — Silver Plume Railroad.

— Photo courtesy Library, State Historical Society of Colorado.

RNMCB-15 personnel break out detachment sign for "Operation Silver Spike" during summer of 1973. Unit will field 200 men in several detachments during June-August 1974 to continue projects.

Reservists Rebuild Narrow

- Pueblo, Colorado

Reserve Seabee operation *Silver Spike* was designed to increase railroad construction capabilities of RNMCB 15, while aiding the Colorado State Historical Society in constructing a mining museum depicting the early silver-mining era in Colorado.

The outdoor museum, now designated a national landmark, will include 1880 vintage displays of silver mines, metal recovery facilities, saw mills, water towers, and related operations.

Access to the display area will be via the Seabee-restored Georgetown-Silver Plume narrow-gauge railroad, operated with authentic locomotives and rolling stock. The display is expected to be operational by Colorado's Centennial Celebration in 1976.

The railroad portion of the museum was originally built between 1881 and 1883 to service the silver mines of the area. Early planners had envisioned the railroad as eventually penetrating the Continental Divide and linking Denver with Colorado's major mining camps. Severe winter weather, torturous mountain terrain, and excessive construction costs, however, deeded the end-of-track to Silver Plume, Colorado.

Declining revenues eventually caused the termination of services on the line and salvage operations were begun in 1939.

The railroad was considered an engineering marvel among early western railroad builders. To gain the 638 feet vertical elevation between Georgetown

Stanchion to a 50 foot pin truss bridge was carried a mile over a narrow access road by coordinating two front end loaders. Other side came in the same manner.

Once a round house turntable at Silver Plume, this 50 foot thru plate structure later served as the low bridge near the Georgetown loop.

High bridge on the Georgetown loop helped provide a feasible average grade for the narrow-gauge line.

—Photo courtesy Library, State Historical Society of Colorado.

Gauge Rail Line in Colorado Rockies

By LCDR R. L. FERRITER, CEC, USNR-R
and
EOC R. G. PLANT, USNR-R

and Silver Plume in just under 2 miles would have required an average grade of +6%—a railroading improbability.

To reduce this grade, the right-of-way was designed with a series of reverse curves and a loop which stretched the length of the trackage to 4.47 miles, and reduced the average grade to 2.7%.

The most spectacular portion of the line was the "great loop" where the track crossed over itself with 80 feet of vertical clearance. The "loop" was carried over the narrow valley by a steel trestle nearly 400 feet in length and 100 feet above the valley floor.

Four principal projects were initially undertaken during Seabee operation *Silver Spike*.

The primary undertaking was the refurbishment of the original right-of-way and the laying of railroad track. The Reserve Seabees accomplished over 1.3 miles of subgrade for track placement, with 3300 linear feet of track laid. This required the shortening of eight-foot ties to six feet to meet narrow gauge track specifications, and the installation of one switch.

The second project undertaken was the disassembly, movement, and reassembly of a 60-foot "pin truss" bridge. The historic nature of this structure required that the truss sections remain intact during movement. This was accomplished by "hanging" the truss between the buckets of two front-end loaders and coordinating the speed of the loaders while they traversed the half mile of narrow access road to the construction site.

A coinciding project was the disassembly, movement, and reassembly of a 50-foot, thru-plate-girder bridge. This bridge was the original roundhouse turntable used at Silver Plume until it was installed in the right-of-way as a bridge to replace a burned-out wooden "Howe truss." When the line was torn up in 1939, the turntable bridge was moved to Denver, widened, and installed as a county road bridge. Seabee work entailed disassembling the road bridge, transporting it back to Georgetown, sand-blasting and painting, and reinstalling it on its original abutments. Both girders were set, and 10% of the cross-bracing was installed prior to the Seabee departure.

The last major project undertaken was the installation of three 20-foot-long log cribs to stabilize the steep back slopes of a deep cut. The cribbing work was subcontracted to an active Army support unit, and was completed at the end of the deployment.

Two "domestic action" projects were undertaken to further enhance community relations. In Silver Plume, one day was expended grading the local streets and recreation areas. In Georgetown, several mandays and much off-duty time was donated toward installing fencing around the newly-established city tennis courts.

Operation Silver Spike was considered a rewarding and morale building training experience by all participants. RNMCB-15's ability to organize and deploy an independent detachment was tested and proved. The battalion safety program was further tested under the rigorous construction conditions without serious mishap. The primary objective of the deployment — to gain hard-to-find railroad type construction experience — was accomplished while aiding the State of Colorado in preserving a portion of its colorful pioneer history for the posterity of all America.

Gandydancers in green, Seabees of RNMCB 15, gain new skills as they tackle the job of re-laying tracks of the historic narrow gauge rail line. The finished section (right) evidences the success of their efforts.

How Ready is PWRS? -- CCI Knows

By DAVID J. SKAR and CHARLES A. COMPTON
Systems Analysis Division, NAVFAC
and ROBERT F. CHIASSON
CBC Command Management Division, NAVFAC
• Alexandria, Va.

One of the objectives of good program management at our construction battalion centers is to balance Prepositioned War Reserve Stock (PWRS) with the Prepositioned War Reserve Requirement and NAVFAC procurement priorities. Our indication of readiness is the degree of success the PWRS manager has in outfitting Seabee battalions to perform contingency construction.

The method for determining readiness or construction capability was compounded further by the decentralized inventory management functions which came into existence in order to encompass all necessary phases of CBC/Seabee operations. A comprehensive investigation and analysis was begun in the stock inventory position for CBC managers.

PWRS managers do not get feedback about the effect of their decisions on the readiness of stock until is is required in a contingency operation. The NAVFAC Construction Battalion Center Command Management Division requested that the Systems Analysis Division develop a Class 2C reserve stock readiness measure to predict the readiness of various stock postures. The resulting quantitative measure, a mathematical model called the Construction Capability Index (CCI), indicates the capability of men and equipment to accomplish contingency construction.

The model considers mathematically the number of reserve battalion personnel who would be engaged in three specific types of construction skills: vertical (buildings, etc.), horizontal (roads, airfield pavement), and special (pipelines, fuel tanks, power plants). Skills are then combined with a machine operation index, age of stock, and dollar volume of stock aggregated to automotive, construction, and service equipment by construction battalion center. Also accounted for are the personnel who prepare equipment for use.

The CCI model methodology solves for four individual sub-objectives: level of personnel training; equipment usability; equipment positioning; and center response. These measurable criteria were weighted to measure degree of contribution of each. Where appropriate, the measured criteria contribute to readiness according to their changing rates of return (non-linear) as their input is increased or decreased. The index has a minimum value of 0 and a maximum value of 100. This maximum value reflects two conditions: one, that all 18 currently authorized reserve construction battalions are fully staffed and that all equipment required by the allowance lists functional components (P-25s, P-29s and P-31s) is on hand, new and operaitonal. A subjective evaluation of the current combined state of readiness of all factors led to the index being "tuned" to give a value between 60 and 70. Changes in these factors will be reflected in corresponding increases or decreases in the value of the index.

The methodology used in developing the model has established an understanding of the interrelationships affecting readiness, and the model provides a vehicle for modifying these relationships to show the incremental effectiveness associated with changes in funding. PWRS managers will be able to ask "what if" questions about readiness, based on dollars available to purchase equipment, to maintain equipment in storage, and to pay reserve personnel. While the current readiness posture is generally known, lengthly manual analysis is required to evaluate proposed changes in manpower skills or equipment investment. The CCI responds immediately to these input variations.

The model is operational and being turned over to the CBC Command Management Division for future operation.

Government Housing Proposed For All Married Personnel

By ROBERT B. SYKES
Planning & Acquisition Division, Family Housing, NAVFAC
• Alexandria, Va.

The advent of the all-volunteer service brought about policy revisions concerning the eligibility of married enlisted personnel for military housing. The first change, put into effect by BuPers on 1 January 1974, provides that enlisted personnel in pay grades E-4, with two or more years of service, are eligible for adequate military family housing, and for travel and transportation allowances.

This change is minor, however, compared with a modification in a recent Program Budget Decision (PBD) of the Office of the Secretary of Defense. If this decision is implemented, all services will be able to program housing for all married enlisted personnel not otherwise adequately housed, and all grades will be eligible to receive allowances for travel and transportation of household goods upon permanent change of station. This policy will provide long needed relief for those lower pay grades who have had to pay their own expenses in order to have their families accompany them, and for whom military family housing has not previously been provided.

Based on the PBD, the Navy FY 1975 Family Housing Program, which will be submitted to Congress later this year, includes 800 two-bedroom units for the lower pay grade personnel. They are to be constructed in San Diego, Calif.; Oahu, Hawaii; Charleston, S.C.; Norfolk, Va.; and Bremerton, Wash. The initial site chosen for the Marine Corps units is Camp Lejeune, N.C. The decision also contemplates an interim DoD-wide leasing program for married personnel in these lower pay grades until the new units are ready for occupancy.

Specific new housing assignment policies have not yet been developed, nor has it been established whether the lower pay grades will be eligible for any existing military housing or be restricted to units specifically built or leased for them.

There are estimated to be more than 5,000 lower pay grade personnel in the Navy who will be either unsuitably housed or involuntarily separated from their families by FY 1978. This revised policy of providing all married enlisted personnel with adequate housing will be of considerable importance in attracting and keeping young married enlistees.

ARCHITECTURAL REGISTRATION:

'How To' for CEC Officers

By LT G. K. CAMBRON, CEC, USNR
• Alexandria, Va.

A fundamental step in becoming a registered architect is establishing eligibility for admission to the National Council of Architectural Registration Boards and individual state board examinations.

Liberalized rules allow government architects 100 percent credit toward registration for experience up to a three year maximum. These standards apply to graduate architects in the military service, provided they perform work comparable to that which they would do in private practice and perform under the direct supervision of a registered architect in a training program.

CEC officers who have a degree in architecture, and who wish to establish eligibility for admission to NCARB or state board examinations based on active duty training and experience, should pursue several actions.

The candidate must first contact a NAVFAC registered architect and establish a formal training program. The architect need not necessarily be in the organization to which the officer is attached. A registered architect within the chain of command or NAVFAC headquarters' chief architect can help establish the officer's credit for certification. In all cases, the scope of the project in question, and the professional level of work performed on the project by the candidate must be known in detail by the NAVFAC architect making the certification.

Registration candidates must maintain detailed records of active duty professional training and experience for which they wish to receive credit. This record must clearly indicate that the professional level of work performed was

comparable to that which would be acquired in private practice.

The NCARB construes assignments such as those involving field supervision of construction, direct supervision of in-house design, administration of architect/engineer contracts, etc., (when performed with NCARB regulations) to be creditable as qualifying experience when the candidate was directly responsible for such or was in charge.

Documentation involves maintaining a detailed log and compiling copies of photographs, sketches, renderings, working drawings, engineering computations, specifications, and models to clearly portray the professional level of the work for which credit is desired.

Candidates are urged to contact Commander, Naval Facilities Engineering Command or the NCARB directly for more detailed information at the applicable addresses.

NCARB, 1735 New York Avenue N.W., Washington, D.C. 20006; Naval Facilities Engineer Command (09M1), 200 Stovall Street, Alexandria, Va. 22332.

CEC Officer Billet Authorizations Revised

By LCDR J. D. PENSYL, CEC, USN
CEC Detailer BuPers
• Alexandria, Va.

In August 1970, the Chief of Civil Engineers appointed a board of officers to conduct a *Zero Base Study* of the ideal structure of the Civil Engineer Corps. The board, upon completion of its study, presented its findings to senior Naval authorities, including the Chief of Naval Operations.

The group's study was based primarily upon financial budgets and the complexity of facilities engineering functions, current replacement plant value in the case of Public Works activities and the number of personnel supervised.

Not surprisingly, the Zero Base Study indicated billet requirements in excess of billets funded in the Five Year Defense Plan (FYDP). It also indicated billet grade structures above those currently authorized.

Obviously, neither the total CEC billet requirements nor billet structure could be achieved within the constraints of the FYDP. Therefore, the distribution of the limited number of billets and the authorized grades for billets became very critical.

Guided by the information contained in the study, the Chief of Civil Engineers, as designator advisor for officer specialties in the Civil Engineer Corps, prepared a master distribution plan for CEC officer manpower. The plan was predicated upon billet requirements for all CEC functions and limited to the number of billets authorized in the FYDP. The Chief of Naval Operations approved the plan and on 12 June 1973, implemented a redistribution of Civil Engineer Corps officer manpower. In doing this, CNO established a precedent by reordering officer manpower among manpower claimants. This redistribution can be summarized as follows:

Billets Added	—	167
Billets Deleted	—	188
Billets Upgraded	—	48
Billets Downgraded	—	98
Billets Modified	—	16

The above changes to existing manpower authorizations were programmed to modify the FY-74 and subsequent year authorizations and were incorporated into activity manpower authorizations to become effective 1 July 1973. Responses to the redistribution plan were reviewed by a manpower advisory group appointed by the Chief of Civil Engineers and recommendations were made to CNO. In all, more than 100 individual billets were included in this review with the result that 42 billets were added or reinstated, 42 billets were deleted, 11 billets were upgraded, 7 billets downgraded, and 21 billets were modified.

Inasmuch as CEC officer manpower is critically limited, future billet changes can be expected as billet grade structures are further refined, as the activity mission or workload changes and/or as additional budget constraints are experienced. Any changes made will be in accordance with the staffing standards contained in the CEC Zero Base Study.

'LINKERS' AID IDEA FLOW

Technology Transfer

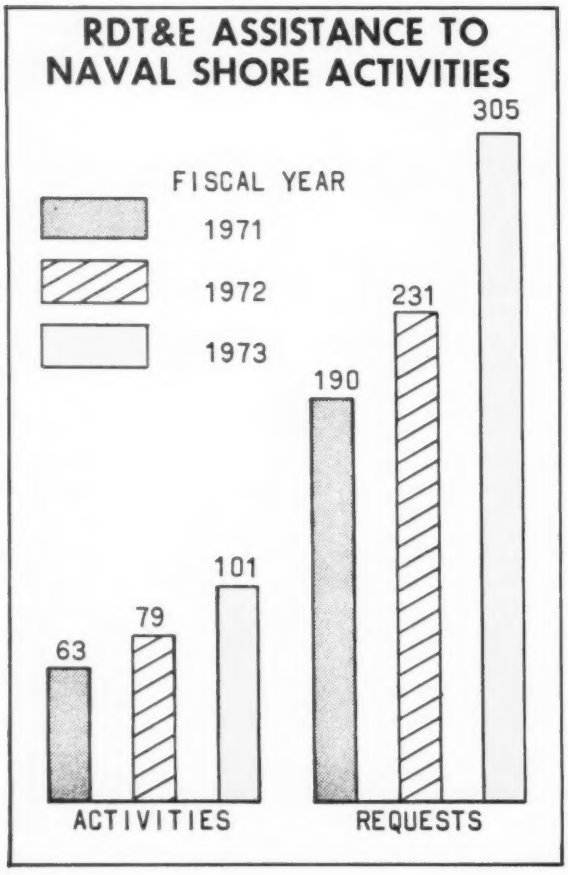
By MILON E. ESSOGLOU
Assistant Director, Plans and Program Divison, Research and Development, NAVFAC

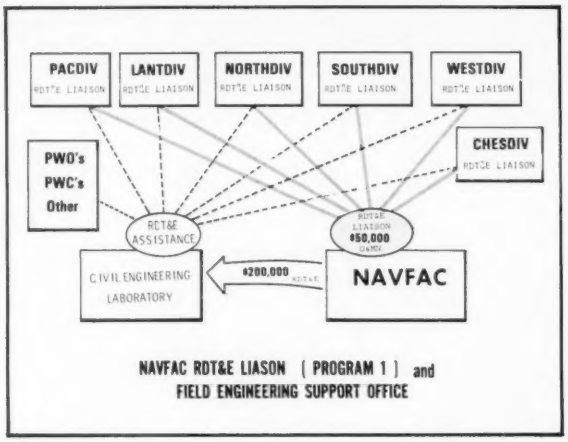
J. T. ROHRER and K. HANKERSON, JR.
Research, Development, Test and Evaluation Division, Chesapeake Division, NAVFAC

•Alexandria, Va.

For the past decade or more industry and government groups have been concerned about the inability of technological information to find its way from the research and development community to a user with a practical need. Concern over this "idle technology" spawned emphasis on "technology transfer".

NAVFAC initially viewed this as a utilization problem and the emphasis was limited to headquarters memoranda urging potential users to read and apply the results of laboratory reports.





NAVFAC RDT&E LIASON (PROGRAM 1) and FIELD ENGINEERING SUPPORT OFFICE

There were also efforts to effect technological communication via changes and updates in the design and maintenance manuals. However, headquarters employees engaged in revising manuals are not generally under direct pressure to solve day-to-day design and maintenane problems. This suggests that they were not too inclined to adopt new concepts and techniques in solving problems as they were toward forming policy and maintaining stability in the system. Instinctively, they became promoters of the *status quo* rather than of change to meet needs.

Later, findings in technology transfer studies clearly pointed to the key role that special individuals could play in the organization — that of bringing in new ideas and technology from sources outside the organization.

This led to the establishment of an RDT&E liason engineer at each NAVFAC Field Engineering Division whose job would be analagous to a technological "gatekeeper". He would open the gate to allow passage of "know-how" from the R & D community to the man in the field who was looking for better solutions to problems. This would reduce the time lag normally required for the R & D "know-how" to find its way via the long established route through design or maintenance manuals.

The liaison man is well-suited to disseminate local solutions and innovations to his peers in other divisions for eventual Navy-wide dissemination. Using the best available feedback on the success of the concept shows that the liaison engineers earn about five times their salary in tangible benefits for the Navy as a result of their technology transfers.

Obviously these liaison engineers are not the exclusive means for technology flow. All engineers should be continuously involved in technology transfer. The difference is that the liaison engineers are paid to tap the R & D knowledge sources when needed.

It often takes a long time before there is a response to a request from the field. This fact cannot be changed. However, current problems cannot wait, therefore a laboratory must be prepared to perform "quick and dirty" or "brush-fire" research and development to meet problems. NAVFAC has provided RDT&E assistance for Naval shore activities since 1963 through the Civil Engineering Laboratory at Port Hueneme, Calif.

As sensitivity to "idle technology" and "R & D responsiv-

ness" grew, the importance of quick response was realized. Starting in 1966 NAVFAC "earmarked" approximately $100,000 RDT&E funds yearly specifically for the Civil Engineering Laboratory to provide "RDT&E Assistance" for field problems. In 1971, the laboratory established the Facilities Engineering Support Office (FESO) to promptly and responsively deal with field requests for RDT&E assistance.

At the same time, the funding "earmarked" for "RDT&E Assistance" was doubled to $200,000 a year.

To date, the results have been impressive — the majority of requests are answered within 14 days and the number of requests and activities making requests has significantly increased, as shown in the comparison chart. A recent sample of requests analyzed by the Naval Postgraduate School showed that a $1 investment returns almost $3 in benefits. This finding was very crude in that it does not reflect the intangible benefits that somewhere along the way have tangible results.

For no-cost, quick-response answers to field problems involving new materials, techniques or equipment, call Gene Early at CEL, Port Hueneme, Autovon 360-4070 *anytime* regardless of time zone (their answering service never sleeps).

Tech Data Sheets and Rap Briefs

In order to make the information contained in CEL's R&D reports more readily available and understood, new styles of reporting have been added. *Tech Data Sheets* describe laboratory solutions and recommendations in a concise, easy-to-read one page format. *Rap Briefs* tell the practicing engineer about the progress of ongoing work at the laboratory.

Naval Postgraduate School

In 1970, Captain Pharo A. Phelps, upon becoming the Assistant Commander for Research and Development, realized the significance of "people" to effective transfer of technology. Studies with the Naval Postgraduate School were initiated to shed light on NAVFAC's peculiar and institutional barriers which impede innovation and the flow and application of technology. To date, a cross-sectional profile of attributes and dispositions of NAVFAC's officers and civilians has been made to determine the relationship between their characteristics and propensity to use new ideas. It was found that the distributions of both officers and civilians along an axis ranging from "linkers" to "stabilizers" were similar. Linkers are those who are not only interested in innovation but want to share it with others. Stabilizers are those who feel that "sticking with proven methods is best". Empirical studies are continuing for hard data to help NAVFAC's managers differentiate between fact and myth on matters of technology transfer and innovation.

Clearly the RDT&E liaison engineers, the RDT&E assistance efforts and the methodic searches by the Naval Postgraduate School are complementary, as shown in the diagram. The effort is intended to benefit all of NAVFAC because technology transfer takes place at all times and because "people" and not "reports" are the heart of it!

CEL's Underwater 'Pickup' Goes to College

• Port Hueneme, Calif.

The Navy's revolutionary underwater pickup truck has been retired from government service and has gone to college.

The Construction Assistant Vehicle (CAV), developed by the Civil Engineering Laboratory (CEL), Port Hueneme, Calif., will now support the marine sciences program at Oregon State University.

Navy research on the present phase of the CAV program is complete, according to Stanley Black, senior project engineer. "We now expect to concentrate our research on a fleet-type CAV for Navy divers," Black said. The university's continued use of the first-generation craft may provide important data for future Navy work in underwater construction.

CAV Rides Again — The CEL-developed "pick-up" that once carried Navy off-shore construction workers has now resumed service, this time under the guidance of the Marine Sciences program at Oregon State University.

Oregon State had the craft transported by commercial barge from Port Hueneme to Coos Bay, Ore. Out of service for more than two years, the CAV will require some rehabilitation by the university before being put to sea, as well as general refurbishing. The 18,000-pound vehicle will be used in a variety of projects, according to Dr. Larry S. Slotta, director of ocean engineering programs at OSU.

A CEL project engineer, John Quirk, conceived the concept for the experimental vehicle in 1967. Black joined him the following year to complete the design. Their joint effort won the American Iron and Steel Institute's Design-In-Steel award in 1971. The recognition was for the best engineering of transportation equipment.

The CAV is a catamaran-hulled vehicle capable of delivering up to 1,300 pounds of cargo, equipment, and divers to and from construction sites to a maximum depth of 120 feet. Its top submerged speed is 2.5 knots.

Black said the university will try to improve CAV's basic capabilities such as maneuverability, load handling, and battery output. One of its functions will be to operate 16 miles from the Oregon coast while the school constructs and maintains an offshore tower.

The Laboratory expects to benefit from OSU's efforts involving the craft; obtaining additional data to help in future CAV research.

CONSTANT INSPECTION AND DOCUMENTATION IMPERATIVE

Public Works Maintenance Staffing Guidelines

By W. H. HOCUTT
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Southern Division, Naval Facilities Engineering Command

• Charleston, S.C.

The naval shore establishment exists to support the operating forces, and maintaining that shore establishment is the primary function of public works departments. This is a multi-million dollar annual enterprise and consists of a multitude of varied tasks, ranging from sweeping floors to the repair of highly complex electrical and mechanical equipment. To provide the required services, public works activities must maintain adequate and properly balanced staffs.

Several factors are considered in developing staffing levels; however, a current valid workload is primary. All documented work, including planned and estimated job orders, inspection reports, work requests and other known requirements, must be considered. The general policy of the Department of Defense that in the United States, new construction, alteration and repair (not incident to maintenance) shall be performed by contract. An activity's work force should not exceed that required to accomplish the normal level of routine recurring maintenance and upkeep. No attempt should be made to cover peak loads of work with this basic force. Normally there is a considerable amount of backlogged work which should be accomplished by contract and cannot be included in a valid public works backlog. The contract designated work does create additional engineering workload and must be considered.

It should be apparent that a well documented backlog is very important in assessing the staffing requirements of the PW department, and, in particular, the maintenance force. This quite often creates a problem due to insufficient identification and documentation of the backlog.

The problem has become more acute in the past few years as many activities have curtailed continuous inspection programs as personnel ceiling and funding constraints have been enforced. Without an effective continuous inspection program, maintenance and repair requirements are not identified and available to support funding and staff level increases.

The requirements may exist, but until they are identified and documented, staff level adjustments are difficult to determine and support. So it is important to keep continuous inspections up-to-date and workload requirements documented at all times, and it is critical to do so prior to a staffing review or manpower validation survey.

The documented backlog is also used to prepare the Annual Inspection Summary (AIS) and while it is not a request for funding, it weighs heavily in determining activity funding. Do not construe that the documented backlog is the only factor considered in determining staffing requirements. Emergency service requirements, dynamic equipment inspection and services and standing job orders represent fixed recurring requirements of maintenance. In determining maintenance control staffing requirements, a variety of functions must be considered, to include: administering work input control, planning and estimating maintenance work by station forces, making control inspections, administering dynamic equipment inspection/services program, preparing annual inspection summary, preparing specifications and cost estimates for maintenance service contracts, reviewing and justifying funding for special maintenance and repair projects and other related maintenance management functions.

After accumulation and validation of backlog and all recurring workload, new measures are applied to arrive at the most efficient staff levels. Generally, maintenance staffing should be based on a six-month backlog for each trade. This means that after covering all fixed, recurring work, remaining staffing should be able to accomplish all known and valid in-house work requirements within six months, provided that no additional work is injected into the system.

It should be recognized that new requirements are identified daily; however, work is being accomplished continuously that should offset a proportion of new requirements. This is true at activities maintaining a relatively constant mission, plant account and station population. Activities that are experiencing a build-up or decline should have their workload monitored periodically to ensure that proper staff levels are maintained.

Maintaining a six months backlog allows sufficient lead time for material procurement, programming, and master shop scheduling. This is not to say that all work will require six months to accomplish. Emergency and priority work may require immediate accomplishment, but, as a general rule, accomplishment of routine requirements will be based on a six-month period from identification to completion.

If current staffing available for backlog accomplishment is less than the number required to maintain backlog at a six-month level, additional staffing is required. If the opposite is true, available staffing is greater than required to maintain six-month backlogs, and staffs should be reduced accordingly.

In the present period of changing conditions due to shore establishment realignment and heavy construction programs, it is essential that staffing of public works organizations be reviewed and the proper staff levels identified. Without a properly balanced work force, the effectiveness and efficiency of public works departments are severely reduced. Public works departments have a continuous job and must have adequate manpower to perform effectively.

Marked seed trees remain after timber is harvested. Painted bands signaled their exemption from the woodsman's axe. Also preserved were the hardwoods in the background.

Forest Management At Camp Lejuene

By JAMES H. FITCH, JR.
Mgr., Specifications & Estimates Branch

• Camp Lejeune, N.C.

An unprecedented $134.75 per thousand board feet for pine saw timber in a $585,000 bid, accepted by the OICC Jacksonville, N. C. area, won Weyerhauser Inc. of Jacksonville a contract for harvesting timber at Camp Lejeune in Fiscal Year 74. The terms call for clear cutting and selective cutting of pine saw timber, pine pulpwood, hardwood saw timber and hardwood pulpwood on 1,735 acres of the approximate 60,552 acres under forest management at Camp Lejeune.

The base command's policy has been to maintain a forest management system compatible with military training requirements, annual production of forest wood products as prescribed in the master management plan, the best possible wildlife habitat correlated with timber management, the recreational and nature study areas, and the natural beauty of the forests.

The majority of Camp Lejeune's timber producing areas are under even-age management, where each harvesting will cut only trees of the same age.

Some acreages along major streams and swamplands, forested zones along the major roads, the base archery range and forested areas around base building complexes are managed under a modified even-age system to produce maximum coordination and benefits for wildlife management and erosion control.

Still smaller areas are managed for enhancement of endangered wildlife species, particularly the red cockaded woodpecker and the osprey.

In order to keep abreast with the even-age management plan and to keep every acre under timber production where possible, reforestation is increasing yearly; carried out by two distinct methods — natural and artificial.

Timber stand improvement in even-age stands is accomplished by sanitation and salvage thinnings, so that weakened trees are removed while yet harvestable. The major improvement work is accomplished by heavy equipment subsequent to clear-cuttings and seed tree cuttings. These sites are prepared by removing debris, such as logging slash, undergrowth, and undesirable species, with a KG (clearing and grubbing) blade. This debris is windrowed, and it is either allowed to decay or it is burned. Occasionally, an 8,000 pound tandem disk is used on the site by itself or in conjunction with the KG blade.

If a site is sparsely covered with debris, the area may be single or double-disked for seed bed or planting preparation. Experience has proven that the better the soil is prepared, the more vigorous the seedling growth is in the first few years.

A total of 576 acres of site improvement was prescribed in Fiscal Year 1972. Coordination with wildlife management is another practice that is emphasized. When sites are being prepared for planting or natural seeding, several clumps of mast and berry-producing hardwoods are left scattered throughout the area. In some instances, strips running across the complete length of a prepared site are left for the benefit of wildlife. These clumps or strips will produce game food annually, thus sustaining wildlife while reforestation needs on the same site are being met. The strips also provide some cover, while the large clearings provide excellent bugging and dusting for wild game birds and browse for deer.

The outstanding work of the base personnel, and especially of the natural resources and environmental affairs staff, led to the award of the 1973 DOD Natural Resources Award.

Timber was measured prior to advertising for bids in order to derive estimate of amount of cutting. (Lower right) Clear cut area after the timber was harvested, but before seedlings were planted.

Contractor's truck with load of harvested timber is on way to mill where it will be converted to pulpwood or lumber.

MAGIC Key to NSF Data Files

By JOSEPH J. CHARNEY
Computer Systems Analyst, NAVFAC
• Alexandria, Va.

The Navy Facilities System (NFS) is the aggregate information system of the Naval Facilities Engineering Command. This means that NAVFAC's numerous and varied ADP applications are structured towards the use of common data elements, precise interfaces and centrally coordinated objectives.

The applications comprising the NFS can best be described functionally in terms of three processes — *requirements, acquisitions, and utilization* — and three major subsystems — *real property, utilities, and civil engineer support.*

Organizationally, the NFS can best be described in two basic parts: a command management information system that serves NAVFAC headquarters, EFDs, and PWCs; and a group of seven uniform information systems having Navy-wide application in the management of real property inventory: shore facilities planning; military construction programming; civil engineer support; construction, automotive and special equipment; public works departments; and environmental quality.

In developing the NFS, one of the early problems was the inability of the various data systems then in use to be mechanically interfaced with one another. Such interfaces could be made only with considerable manual effort, if at all.

The problem arose for two reasons. First, since each of these systems was developed independently and at various times, the progress of ADP operations and the sources of information available on naval activities varied. As a result, the means of identifying an activity within the systems — the code or system key — varied. Second, each system maintained general information on activities required by that system. Such information was maintained independently of that in other systems, usually by different individuals and frequently at different locations. Great variations developed between systems.

For the NFS to function properly, it was essential that the various systems be made compatible with one another. In redesigning them, the *unit identification code* (*UIC*) was used as the single means of identifying an activity.

In addition, separate maintenance of activity general information was abandoned in favor of a single file approach. This file is the master activity general information and control (*MAGIC*) file.

MAGIC is a centrally maintained file of functional and geographic data pertaining to all Naval shore activities, certain units of the operating forces, and such other DOD and non-DOD activities as are necessary to identify in the NFS.

The functional data includes such items as activity codes, names, and host/tenant and command relationships. Geographic data includes city, county, state and country codes, naval district, master plan and geopraphic coordinates. Through central maintenance of a single file, the wide disparity of data which previously existed between systems has been eliminated.

MAGIC data is currently extracted for use by the Facilities Systems Office (FACSO) in processing the real property inventory (RPI) system, the basic facilities requirements list (BFRL), the construction, automotive and special equipment system (CASE|MIS), the construction management system (CMS), and the environmental quality data system (EQDS).

Several applications designed at NAVFAC headquarters also utilize this file. These include the deficiency analysis data system (DADS), pesticides usage, and the CEC officers reporting system. In addition, the military construction programming system (MCP|MIS), currently being redesigned for terminal access and update, will utilize the MAGIC file as the source of critical elements of activity general information.

The MAGIC system provides for a printout of the data contained in the file to be sent to each activity, with information copies to the major claimants and EFDs. Thus, the activity is able to see and verify its own data. The printouts are marked up with necessary corrections or revisions and forwarded to NAVFAC Headquarters for updating of missing or erroneous data elements, providing meaningful dialogue between NAVFAC and the activities.

Future plans for the MAGIC file include modification to provide immediate access and update via terminals. In addition, a telecommunications link is anticipated between NAVFAC headquarters and FACSO, so updated data will be immediately available for use at both locations.

With the various application files capable of being accessed at a common level, and the MAGIC file providing the key through the UIC, a truly integrated NFS is becoming a reality.

By interfacing the files from various facilities applications and drawing activity information from a common MAGIC file, it will be possible to provide consolidated reports, giving management a more accurate picture of the total facilities assets and requirements of the Navy.

'Deep Freeze' Task Force Returns From Antarctica

• Davisville, R I.

The U. S. Navy's "Operation Deep Freeze," the Antarctic task force, returned to its home base at Davisville Construction Battalion Center in March after a five and one-half month deployment to the world's southernmost continent.

Their return marks the last time the command will return to Davisville. The headquarters of the Navy's Antarctic operations is being moved to Port Hueneme, Calif. this summer.

Capt. Alfred N. Fowler, USN, commander of the Antarctic Support Force, arrived at the Quonset Point Naval Air Station with 165 members of his command on February 28.

C-130 ski-equipped Hercules aircraft of Antarctic Development Six have been based at Point Mugu, Calif. since it was shifted from Quonset Point last summer.

Navy units of the Antarctic Task Force will also return to their home bases in Norfolk, Va. and Mayport, Fla. while the Naval air arm of the task force will return to the Point Mugu base.

Coast Guard icebreakers USCGC Staten Island and USCGC Glacier will return to its West Coast home ports about mid-April.

The Navy's Mobile Construction Battalion 71, homeported at the Davisville Seabee Center, has completed its construction effort at the geographic bottom the the world. This is the last year for the Seabees on "The Ice."

Guatemalan Navy Gets a Lift

By LCDR G. D. FRAUNCES, CEC, USN
Staff Civil Engineer, U.S. Naval Forces Southern Command

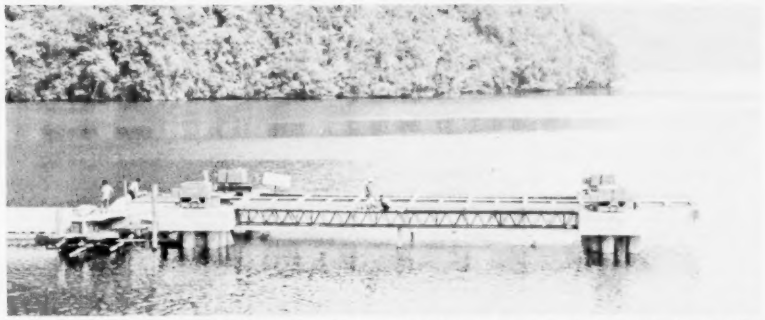
• Fort Amador, C.Z.

The continuing interest of NAVFAC in the development of the Central and South American navies recently enabled the Guatemalan Navy to achieve a major milestone in its quest for self-sufficiency. Completion of a 230-ton haul out facility at Santo Tomas, on Guatemala's Atlantic coast, means that their patrol boats can now be placed ashore at the naval base for routine maintenance and overhaul. Work is now underway on a transfer system, maintenance shops and support facilities for a small craft repair yard.

This $350,000 project, executed and paid for with Guatamalan government resources, is an interesting example of the application of NAVFAC technical assistance to a small navy. Although not large by our standards, this project is the largest facility investment ever made by the Guatamalan Navy. A six year period was required from initial studies in 1968 to final testing; and NAVFAC representatives were consulted at every decision-making point. Guatemala's Army Corps of Engineers was designated as construction agent since their navy had no facility engineers.

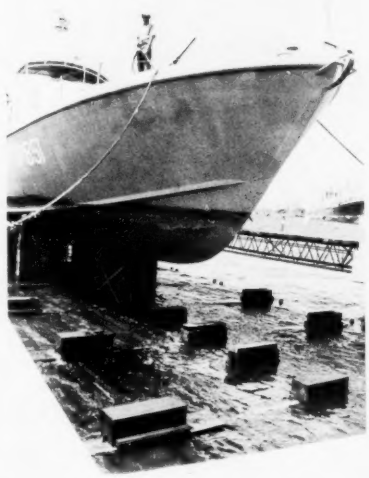
After a thorough study of various haul-out systems, the Minister of Defense selected a Syncrolift elevator similar to the type the U.S. Navy recently installed at the Surface Effect Ship Test Facility at the Naval Air Station, Patuxent River, Md. Normal contracting procedures were used both for equipment procurement and for construction of the civil works by a Guatemalan contractor. The Syncrolift components were delivered to the job site in June 1970, but the civil portion was more difficult to get under contract and the actual construction start was delayed until November 1971.

U.S. technical assistance consisted of periodic visits to Guatemala City and to the site to provide design and contract administration assistance and quality control inspections. Construction plans and specifications were prepared in English and Spanish by NAVFAC's former Caribbean Division, and consultation and guidance continued from the Atlantic Division after CARIBDIV was disestablished.



Lift elevator consisting of four 90-ton electric winches, each supported by a pile cluster, nears completion. The 100' x 30' platform, at this point without decking, can be lowered to permit a vessel to be floated in from right to left between the pile supports.

The project involved three CEC officers successively assigned as NAVFAC's Civil Engineer Advisor for Latin America to the staff of the Commander, U.S. Naval Forces Southern Command in Panama. Cdr. Jack Moger, the catalyst after he recognized the need, helped the U.S. Military Group to convince the Guatemalan Navy of the value of constructing a boat repair facility and conducted feasibility studies on system selection. LCdr. Thomas Oswald guided the project through design, contract award and construction start. He assisted in the collecting of topographic and soil data, helped to write the country - to - country agreement and served as a member of an *ad hoc* board appointed by the Commander, Military Group, Guatemala, to analyze contractors' proposals and make recommendations to the Minister of Defense. The author helped to keep the work moving through various bottlenecks to final testing and turnover. When the Army engineers became involved in a dispute with the contractor about the amount of dredging required and the effects of sedimentation, he conducted an independent study which supported the government's position and the work was resumed.



An 85 foot patrol boat founded on the keel blocks of Syncrolift. Bildge blocks placed against the hull provide stability as craft is hoisted clear of the water.

As the Syncrolift neared completion, a preliminary cost estimate for a complete boat yard was prepared and presented to the Minister of Defense in the form of a 5-year development plan. As of this writing, the Guatemalan Army engineers are working on the recommended transfer system, shop buildings, beach stabilization, access roads and storage areas. It appears that the Guatemalan Navy is trying to make up for the lost time by compressing this five-year plan into three.

Briefly, this describes the type of facilities assistance NAVFAC is providing to allied navies. In keeping with the doctrine of mature partnership, technical assistance and skill training were shared with a nation that had the desire and drive to achieve a goal and was willing to commit its scarce resources to see it through to successful completion.

Capt. Jortberg Selected as Rear Admiral

• Washington, D.C.

The nomination of Capt. Robert Francis Jortberg for promotion to the grade of Rear Admiral in the Civil Engineer Corps has been approved by the President and sent to the Senate for confirmation. Capt. Jortberg is presently serving as the commanding officer of WESTDIV at San Bruno, Calif.

A graduate of the U. S. Naval Academy, Capt. Jortberg was commissioned an Ensign in June 1947, then served on the destroyer *USS R. H. McCard* and as an instructor at the Naval Academy Preparatory School, Bainbridge, Md. He transferred to the Civil Engineer Corps and received his bachelors degree in Civil Engineering from Rensselaer Polytechnic Institute in 1951. He earned a masters degree in management at RPI in 1958 and completed the advanced management program of the Harvard Business School, graduating in May 1969.

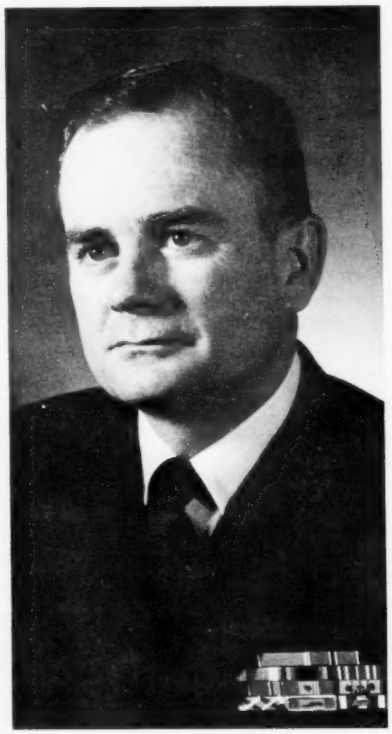
While serving as the last Officer in Charge of Construction, Vietnam, Capt. Jortberg was responsible, in July 1972, for the close out of the $1.9 billion construction contract with the joint venture of Raymond, Morrison-Knudsen, Brown and Root, and J. A. Jones.

From July 1969 to January 1972, Capt. Jortberg served at the U. S. Naval Academy as the Deputy for Management and as the Public Works Officer and Resident Officer in Charge of Construction.

He served as the Southeast Asia Program Coordinator at NAVFAC headquarters from 1967 to 1969, and earlier as the Director of the Military Construction Program Management staff.

Other assignments were: Chief Staff Officer, 30th Naval Construction Regiment in Vietnam (May 1966 to July 1967; Operations Officer, Commander, Construction Battalions U. S. Atlantic Fleet, and Commanding Officer and Executive Officer of NMCB-7.

Capt. Jortberg has earned the Legion of Merit (With Gold Star), Bronze Star Medal, Meritorious Service Medal, the Navy Unit Commendation, and the Republic of Vietnam Meritorious Unit Citation (Gallantry Cross) and Distinguished Service Order (Navy) by the Republic of Vietnam.



Health Sciences University Planning Underway

By CDR E. W. McLAUGHLIN, CEC, USN
Director, USUHS/NATNAVMEDCEN Program Office

• Bethesda, Md.

The Naval Facilities Engineering Command has been designated as construction agent for the Uniformed Services University of the Health Sciences (USUHS) and for the redevelopment and modernization of the National Naval Medical Center, Bethesda, Md.

The USUHS was authorized by Public Law 92-426, enacted September 21, 1972, which specifies that the university shall graduate not less than 100 medical students annually, with the first class scheduled to graduate by 1982.

It will be constructed as a tri-service complex on the Bethesda grounds, utilizing the naval hospital there; Walter Reed Army Medical Center, Washington, D. C.; Malcolm Grow Air Force Hospital, Andrews Air Force Base, Maryland, as teaching hospitals for clinical experience.

Redevelopment and modernization of the National Navy Medical Center includes the construction of a new hospital which will adjoin the existing facility. The present hospital will be refurbished and converted to use for other functions.

A preliminary estimate of the construction cost of these two undertakings is in the range of $200 to $300 million.

Because of the obvious close relationship between the USUHS and the new naval hospital, one architect-engineering firm/joint venture will be selected for the design of both facilities.

The selection process is now underway at NAVFAC with the cut-off date for A/E submissions having been 28 January 1974.

To execute NAVFAC's responsibilities related to design and construction of the USUHS and redevelopment of the Navy medical center including cosntruction of the new naval hospital, a construction program office was established at headquarters effective in January.

The initial staffing of the office will be accomplished by special detailing of present headquarters personnel. The long-term plan is that it will evolve to an OICC organization reporting to COMNAVFACENGCOM for operational and administrative command.

This, however, must await approval and obtainment of additional resources which have been requested from higher authority.

Ultimate staffing of OICC USUHS/NATNAVMEDCEN is planned at 10 officers and 80 civilians. The organization will consist of an OICC, a deputy, a project management office, an administrative division, a contract division, an engineering division, and a construction division.

Videorecorder Aids Field Unit Tasks

By E. A. BYRD
Deputy Director of Programs
Southern Division, NAVFAC

• Charleston, S.C.

In April 1973, Southern Division, with funds provided from NAVFAC's Research, Development, Test and Evaluation Program, purchased two battery operated videotape recorder systems that can be carried and operated by one person.

Each system consists of a hand-held or tripod-mounted video camera with zoom lens and built-in microphone, connected to a shoulder or back-carried video recorder. The latter records both picture and sound and plays them back on a monitor or, with an inexpensive optional radio frequency modulator, on a regular color or black and white television set. Each camera is equipped with an electronic viewfinder that shows the operator his picture as it will appear on the television screen. The viewfinder can be used for playback to check the tape as soon as it has been recorded.

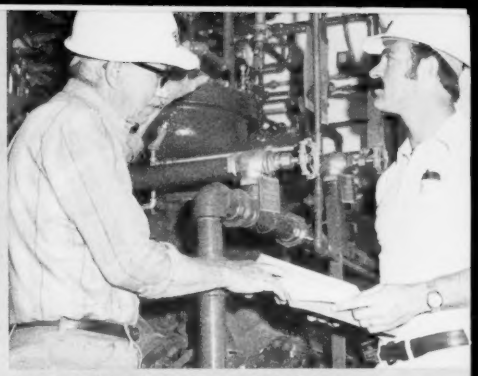
Special features include stop action, audio that can be added after recording of video, and a recording and playback time of thirty minutes on one reel of tape. The total weight of the system (camera, video recorder, battery pack, tape and reel) is approximately 25 pounds.

SOUDIV also purchased a videocassette recorder with which to prepare videocassettes from tapes for distribution as needed.

At the present time one of the video tape recorder systems is being used at New Orleans to provide periodic videotape updates of construction progress in that area. When the tapes are received at Southern Division headquarters, a videocassette is prepared and sent to NAVFAC, where a videocassette recorder is used to play back the cassettes. Both the tapes and the videocassettes can be reused, which makes the system very economical to operate.

To date, many uses have been found for the system: e. g., construction progress reporting, special construction problems, documentary films, ground breaking ceremonies, training sessions, monitoring of master planning presentations, etc.

The cost of the system was modest and most items were covered by GSA price lists.



Harvie E. Young (left), construction representative at Mare Island (Calif.) Naval Shipyard, coaches Theodore Harris, construction representative trainee.

FILLING THE VOID

BY HARRY C. CULLEN
Director, Personnel Division,
WESTNAVFACENGOM

By EDWARD L. HUGHES
Director, Construction Division,
WESTNAVFACENGOM

• San Bruno, Ca.

Construction contract administration in the Naval Facilities Engineering Command family is undergoing some basic changes in method from the previous system, commonly referred to as NCIS (Navy Construction Inspection System). Among the recent approaches being considered are Contractor Quality Control (CQC), Construction Management, Fast Track, Title II inspection, etc.

With these changed approaches, the Western Division recognized the need for a group of young, construction industry-oriented personnel that could be molded into sub-professional administrators as part of the contract administration team. A program was developed to establish in the Construction Representative, GS-809, series a career development ladder with personnel entering the system at the GS-5 level and, after training, moving ultimately to the target position of GS-9.

Key elements in the success of this program were: recruiting personnel with some formal training and trade experience; establishing individualized training plans; and periodic follow-up to see that the training plan was being followed and that the trainee was receiving both formal and on-the-job training. The local Resident Officer in charge of Construction is assigned as the key trainer to provide control at construction sites.

Since its inception, 10 persons have been brought into this career development plan at WESTNAVFACENGCOM. Their education and experience profile is as follows: *Age* — Ranges from 25 to 44, with 32 as average.
Trade Experience — Varies but generally in construction trades. Several with architectural and/or civil drafting experience.
Education — Generally high school graduate. Several studying part time for degree. Some others not pursuing degree, but possess formal education in construction technology.

An unexpected benefit from the program was the attraction of people with exceptional backgrounds which, for various reasons, could not qualify at higher grade level entrance positions such as the Construction Respresentative GS-9 journeyman position.

The success of this program has been confirmed through comments from the individuals as well as the ROICCS to which they have been assigned. It is evident that the system will provide a very suitable program for career development for minority and Vietnam veterans and for position management objectives.

Randy Lee (right), construction representative trainee at Marine Corps Air Station, Yuma, is coached by Ernest Bartlett, a qualified construction representative.

Rites Held For 3 Slain Officers

FATAL AMBUSH REMAINS UNSOLVED

CAPT. THOMAS J. MITCHELL, CEC, USN

CDR. LELAND R. DOBLER, CEC, USN

LT. CHARLES H. JEFFRIES, II, CEC, USN

Death by ambush claimed the lives of three Civil Engineer Corps officers April 13, on the outskirts of the U.S. Naval Base, Subic Bay, Republic of the Philippines.

The victims of unidentified assailants were Captain Thomas J. Mitchell, commanding officer of the 30th Naval Construction Regiment, headquartered in Guam; Commander Leland R. Dobler, commanding officer of Naval Mobile Construction Battalion 133 based at Camp Shields, Futema, Okinawa and homeported at Gulfport, Miss. and Lieutenant Charles H. Jeffries II, officer in charge of an NMCB-133 detail at Subic Bay.

The officers were shot and killed in mid-morning while inspecting a newly constructed boundary road of the Subic Naval Base. The Seabee unit engaged in construction of the road heard the fatal shots and rushed to the site to discover their officers dead.

A U. S. Marine team and a unit of the Philippine Constabulary responded to the tragedy locale but was unsuccessful in locating the attackers.

A formal U. S. Naval investigation with Philippine authorities cooperating is still in progress. At present investigating officials have indicated no knowledge of the identity of the assailants nor a cause for such an attack.

Capt. Mitchell, the commander of the 30th NCR, served as aide and special assistant to RADM Eugene Peltier, Chief of the Bureau of Yards and Docks (predecessor to the Naval Facilities Engineering Command) in 1960-61. He was the first Civil Engineer Corps officer to graduate from the advanced nuclear power course at the Submarine School, New London, Conn. and was the first officer-in charge of the PM-3A nuclear power plant at McMurdo Sound, Antarctica. Funeral services and internment were held at Arlington National Cemetery. Capt. Mitchell is survived by his wife Lois, and children Tommy and Lee of 2018 Crosby, Apt. D, Philadelphia, Pa., 19112.

Cdr. Dobler, a native of Stockham, Nebraska, began his Naval career in 1956 following graduation from the University of Nebraska. He assumed command of NMCB-133 on August 3, 1973 and deployed with the unit to Guam in February. Memorial services were held for the deceased at the Construction Battalion Center, Gulfport, Miss. with burial services at York, Nebraska. Survivors include his wife, Gladys, and their children, Kendall, Stephen, Phillip, Alexis and Andrew of 308 St. Augustine Drive, Long Beach, Miss., 39560.

Lt. Jeffries was a 1967 graduate of the U. S. Naval Academy and received his master's degree in civil engineering from Purdue University. Surviving him are his wife, Ginny, and children, Douglas and Amy Lee, of 116 Vance Place, Long Beach, Miss., 39560. Final services and internment for Lt. Jeffries were held at Arlington National Cemetery.

April 13, 1974

Republic of Philippines

Naval Facilities Engineering Command
SITUATION REPORT

CNO PROGRAM ANALYSIS MEMO - CPAM is a new procedure included in the Programming, Planning and Budgeting system last year. It enables the CNO Evaluation Board to analyze the Navy's future requirements and through the use of CPAM, provide guidance within the Navy for developing and funding the Navy's Program Objectives.

COMMAND MANAGEMENT PLAN The FY 75 CMP is currently under development and should be distributed in June. This document will reflect format changes recommended during Phase I of the CMP Study Group chaired by RADM R. F. Jortberg. For the first time NAVFAC will publish the CMP on microfiche in order to expedite printing and mailing costs.

OICC/ROICC CONFERENCE - RADM Marschall was the luncheon speaker at the 22 January CHESDIV OICC/ROICC Conference. The business session included NAVFAC speakers, Bob Robertory on Claims Administration and Bob Cahoon outlining the new NAVFAC approach to CQC. Major theme of the one day sessions was total Construction Management by the ROICC/EFD team.

NON DESTRUCTIVE TESTS - CHESDIV has developed a capability in the Non Destructive Test (NDT) field. The inventory of equipment includes thermovision, X-ray, ultrasonics, digital thickness instrument and boroscopes. While the development of this expertise came about during the investigation and design phases of hyperbaric facilities, it is being incorporated into quality assurance procedures of standard facilities. The thermovision camera has been utilized in energy conservation surveys of buildings and to identify leakage or "hot spots" in heating plants and distribution lines.

HOUSING ENERGY CONSERVATION HANDBOOK - A new NAVFAC handbook is currently being distributed to the Housing Management Centers. The energy conservation handbook contains motivational programs, instructions for preparation of self-help energy conservation kits, sample calculations, savings, etc. It also contains publicity documents (posters, brochures, stickers and other items). The purpose of the handbook is to supplement established NAVFAC publications and guidance on utilities conservation to ensure an aggressive family housing energy conservation program.

Naval Facilities Engineering Command
SITUATION REPORT

OCCUPATIONAL SAFETY AND HEALTH ACT - passed in December 1970, EO 11612 of July 1971 and a new proposed Executive Order are significantly impacting on the Navy Budget. For NAVFAC activities OPN and O&MN costs of $4.55 million has been proposed for FY 76. This figure includes additional safety personnel, one time protective equipment update and annual equipment replenishment. All levels should consider OSHA when developing budget submittals.

CBC DAVISVILLE REDUCTION - The mission of the CBC Davisville will be reduced to providing storage and preservation facilities for Advanced Base and Mobilization Stocks and mobilization facilities for the Naval Construction Force effective 1 July 1975. Active forces stationed there will be relocated to the Construction Battalion Centers at Gulfport, MS and Port Hueneme, CA, the Naval Station, Norfolk, VA and the Naval Amphibious Base, Little Creek, VA. Civilian employment will be reduced to approximately 200 people. Land and facilities that are not required for the storage mission will either be declared excess or leased to the State of Rhode Island. Leases, permits and licenses, as appropriate, will be granted to the State for use during peacetime of land and facilities required for mobilization purposes.

REAL PROPERTY MAINTENANCE - The FY 75 O&MN Real Property Maintenance Budget includes $128.4 million for major repair projects (approximately four times the normal budget). This emphasis reflects Navy and OSD concern over the condition of Navy facilities and its effect on habitability, readiness, safety and long term economy. Station personnel, major claimant staffs, and EFDs must gear up to take maximum advantage of these funds and to make timely obligations.

DEFENSE ENERGY INFORMATION SYSTEM - Instituted by OSD, DEIS will provide all management levels with data needed to manage that part of the energy crisis that effects them. It is evolving into four distinct phases: DEIS-1, a petroleum products inventory report; DEIS-2, utility energy consumption report; DEIS-3, energy in transit, and DEIS-4 which will establish compatibility with other data bases, e.g., conservation and energy related fiscal data. DEIS-1 and 2 are currently in operation. In its final form DEIS will eliminate quarterly energy conservation reports.

EFD SURVEY TEAMS - CNM directed NAVFAC to implement energy conservation surveys of all Navy shore activities. Survey teams will provide technical expertise and assistance to shore activities to help meet energy consumption reduction goals and limit adverse impact on fleet support. EFD Survey Teams will visit all shore activities in their area by 30 June 1975. Teams will help develop specific contingency plans to cope with future fuel shortages and assist in preparation of repair and MCON projects projected over the next five year period.

ENERGY REDUCTION - In second quarter FY 74 energy reductions, including Marine Corps activities ashore, compared to FY 73 were 9.6% for utilities purchased and generated; 14.1% for ground support equipment (gasoline and diesel). These reductions represent an equivalent of 674,000 barrels -- a cost avoidance of $6.7 million. For the remainder of FY 74 the Navy's target for reduced consumption of energy ashore is 15%.

ST ALBANS HOSPITAL - The Navy hospital at St. Albans, New York was turned over to the Veterans Administration on 14 March 1974. Participating in the Washington, D. C. ceremonies were RADM A. R. Marschall, Chief of Civil Engineers; VADM D. L. Custis, Surgeon General and Mr. D. E. Johnson, Administrator of Veterans Affairs who accepted the Navy hospital for the Veterans Administration.

POST CONSTRUCTION REVIEWS OF NAVAL HOSPITALS - Surveys of three hospitals by a joint BUMED-NAVFAC Committee have been approved as the basis for developing the combined talents of the medical and engineering professions to meet modern hospital requirements. BUMED and NAVFAC have agreed that guidelines proposed are necessary to assure the best balance between medical advancement and construction technology.

SEABEE TEAMS - On 14 December, Seabee Team 0522 completed a two and one half month deployment to Columbia and Haiti with the Navy's hospital ship USS SANCTUARY. Seabee Teams are currently working in TTPI on Ponape, Yap, Palau and Truk. The Air Force Civic Action Team (CAT) will relieve Seabee Team 6209 on Truk in May 1974, reducing the Navy to three deployed Seabee Teams.

Naval Facilities Engineering Command
SITUATION REPORT

DEEP FREEZE CONSTRUCTION ENDS - Deep Freeze 74 construction season in Antarctica was brought to an end in February. Projects at McMurdo Station and the new South Pole Station were completed and turned over to Commander, Naval Support Force, Antarctic on 7 February. NMCB 71, last NCF unit to deploy to the Antarctic, returned to CONUS ON 20 February. With the end of this past austral summer the Seabees have completed their final deployment to the ice. The National Science Foundation is contracting for the construction and maintenance of South Pole Facilities. However, Seabee presence in Antarctica will continue into 1976 while the PM-3A nuclear power plant is being dismantled.

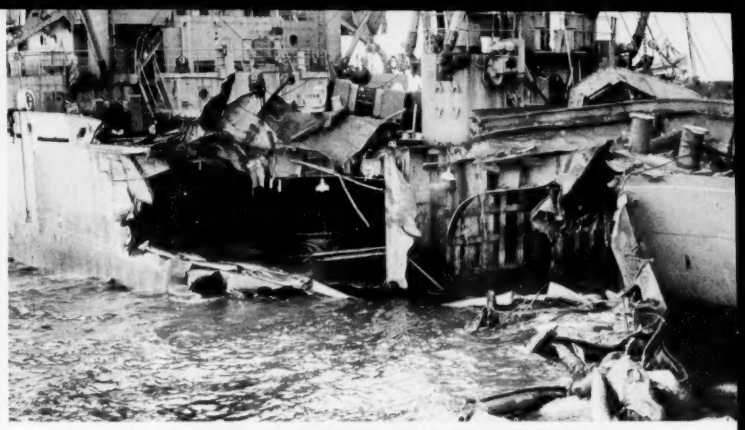
MEMORIAL DEDICATION - Ground has been broken for the Seabee Memorial which is now planned for dedication on 27 May 1974, this year's Memorial Day. Designed and sculptured by Felix de Weldon, the Memorial honors all Seabees past and present. It will be located on the "Avenue of Heroes" entrance road to Arlington National Cemetery. The site is in close proximity to the old location of the NAVFAC headquarters. The Seabee Memorial Association, Inc., a non-profit organization raised funds through voluntary contributions to build this memorial and institute an educational scholarship fund for sons and daughters of Seabees as a living memorial.

NEW NAVY HOSPITAL - Current plans call for the replacement of the Balboa naval hospital with a new facility. Replacement is to be accomplished in several increments beginning with the construction of an 800-bed hospital for acute care and a light care facility of 300 beds, plus outpatient clinics to accommodate about 2,600 people a day. Follow-on construction will include a hospital corpsman school, bachelor enlisted quarters, recreational and support facilities. Estimated construction costs are in the range of $100 to $200 million. The new hospital is scheduled to be operational in the late seventies.

TRIDENT - The draft Environmental Impact Statement for the proposed TRIDENT support site was filed with the Council on Environmental Quality on 21 March. A public hearing on the Draft Environmental Impact Statement is scheduled in the Bangor, Washington area for 24 April. Most of the OICC staff began moving from Alexandria to Bangor in February and additional recruiting is underway to augment the staff.

Completion of oil-spill cleanup efforts after a collision of the *USNS Private Joseph F. Merrell* and the Liberian freighter *Pearl Venture* was announced by the commandant of the 12th Naval District, Rear Admiral William S. Guest, USN.

"All State and Federal agencies as well as the U. S. military departments involved displayed an exemplary degree of cooperation which resulted in the solution of a difficult and taxing problem in the least amount of time, with the minimum possible after-effects," the admiral said.



Extensive damage to USNS Joseph F. Merrell led to escape of some 400 barrels of fuel oil off California coast.

Cleanup Completed After "Merrell" Collision

• San Francisco, Calif.

The *Pearl Venture* and the *Merrell* collided in pre-dawn fog December 29 about 50 miles south of Monterey, Calif., and 11 miles off Cape San Martin on the Big Sur coastline.

The *Merrell,* since declared a total "constructive loss," almost immediately lost about 400 barrels of fuel oil which, at one time, spread along a 10-mile ocean path a mile wide at some points.

Navy and Coast Guard personnel went to work immediately to contain ship damage and reduce environmental impacts caused by the accident. Cleanup and salvage equipment and men from various military installations were rushed to the sites of the oil spills and around-the-clock efforts were begun to control the situation and clean up oil from the beaches. The total cost of the cleanup alone is expected to be between $300,000 and $400,000.

Crumpled deck and scattered fittings attest to destructive impact on Merrell.

Greatest activity moved to San Luis Obispo Bay when the *Merrell* was towed to the small port of Avila Beach December 30 to prevent possible loss of the ship and increase the ability to contain oil from the leaks.

Storms and high seas disrupted the cleanup and caused leakage from containment booms placed around the stricken ship. Some oil was discovered January 1 by California state fish and wildlife employees on a two-mile isolated strip of Oceano Beach, about eight miles south of Avila Beach. Small amounts of oil spilled from barrels being used in the cleanup and was washed ashore near Port San Luis wharf.

The *Merrell* was towed to Port Hueneme January 12, arriving the next day. It will remain there until sold for scrap. The *Pearl Venture* is undergoing repair in Los Angeles.

Bay area Navy and Coast Guard men and equipment worked on the problem, as well as those from the Monterey area, Seabees from Port Hueneme and NAS Lemoore, and airmen from Vandenberg AFB.

State fish and wildlife employees tended the few fowl found spattered with oil, and provided assistance and equipment to the overall effort. Civilians under contract for salvage and environmental protection services were also instrumental in the completion of the job.

Residents of the San Luis Obispo Bay area and state wildlife managers both heaped praise on those responsible for the "tremendous effort" made during the cleanup and expressed ". . . total satisfaction with the conduct of the cleanup operation," according to reports received by Navy officials.

"The efforts and determination exerted by the numerous personnel involved," Admiral Guest stated, "culminated in the successful completion of the difficult task."

Rebuilding of old U.S. Naval Base at Subic Bay included extension on existing Alaval Dock by Seabees of the 115th.

Davisville Monuments

(continued from page 6)

occupation by the Japanese in World War II. As they were being driven out the Japanese forces managed to destroy most of the machinery. Seabees of the 115th salvaged everything possible and had extensive repair shops in operation in short order. The new facilities even included some items which were not in the original shops, such as rollers capable of forming 36″ diameter pipe, 1500°F. annealing furnaces and a 2200°F. furnace for use in making castings and for heat-treating.

One operation of the 115th which received much high level attention was their furniture factory. With the assistance of local hire Filipinos, they mass produced excellent bamboo furniture. Orders for this furniture came from several flag officers.

Another important project, a complete camp for 5,000 men of the Amphibious Training Command, was intended for training troops scheduled to take part in the invasion of Japan. More than 200 buildings were erected in a little over three weeks. The facility was later used as a receiving station after the Japanese surrender. The 115th was still on duty in the Philippines at the war's end.

The men of the 96th Naval Construction Battalion probably considered themselves veterans of three campaigns: European, Pacific and Troop Train.

"The Traveling 96th" was one of the few battalions to be stationed at all three Seabee centers: Gulfport, Port Hueneme and three times at Davisville. On one trip, their troop train carried them by a circuitous route from Davisville to Buffalo, N. Y. then through northern Florida on the way to Gulfport, Miss.

After repeated railroad tours of the East and Gulf coasts, the 96th finally embarked to the Azores Islands in January 1944 — the first of the American armed forces to land there in the war. They built a complete base for an Army Air Corps B-24 Liberator Bomber Squadron. In less than three months they completed the usual personnel, airfield and support facilities, as well as a small boat basin, a fuel tanker anchorage and recreation facilities. When the base, named Camp Santa Rita, was completed, the 96th returned to the U. S. and eventually was transferred to Port Hueneme.

In late January 1945, the battalion departed for Manicani Island in the Samar-Leyte area of the Philippines. Upon arrival the 96th NCB began constructing a fleet repair base which included shops, waterfront facilities, warehouses, barracks, roads and support facilities. It was necessary to clear an area of approximately 250 acres of dense tropical forest. Working in this hot, humid climate the Seabees quickly adopted whatever type of work "uniform" suited them; in many cases just a floppy fatique hat, shorts and shoes. In one instance these circumstances resulted in a problem between a Seabee and the battalion censor. The censor returned a picture of a shaggy, half-naked old man to one of the Seabees saying; "We can't send through such degrading pictures of the natives." "Whaddya mean native?" cried the Seabee. "That there is a picture of me!"

Shortly after the Japanese surrender the 96th NCB was transferred to Tsingtao, China. Their arrival on 1 November 1945 was an abrupt change for the Seabees. Coming from a tropical forest to a cold city required a considerable adjustment. The Chinese currency also necessitated some severe adjustments. The Federal Reserve Bank notes of the Japanese puppet government were still in use and had a rate of exchange fluctuating between 3,000 and 5,000 to one U. S. dollar. No doubt there are many ex-Seabees of the 96th who can fondly recall having spent in excess of "$100,000 dollars" on liberty during this period.

The histories of these battalions are most interesting accounts of the actions and accomplishments of the first Seabees, possibly an excellent cross-section of all WWII NCBs. It is hoped this re-telling will provide present day Seabees with an appreciation for the accomplishments of their predecessors. As mentioned in the foreword of the 96th NCB cruisebook, "Pride is a privilege earned by achievement." That being the case, the pride of every Seabee, past and present, would seem to be well-earned.

The 96th Naval Construction Battalion deployed to the Azores Islands in the Atlantic, where they erected a bomber landing field and (photo right) temporary mooring masts for use by lighter than air craft. In the Pacific theatre they operated a lumber storage yard at Manicani Island, Philippines and constructed a Marine Corps Air Field at Tsingtao, China.

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